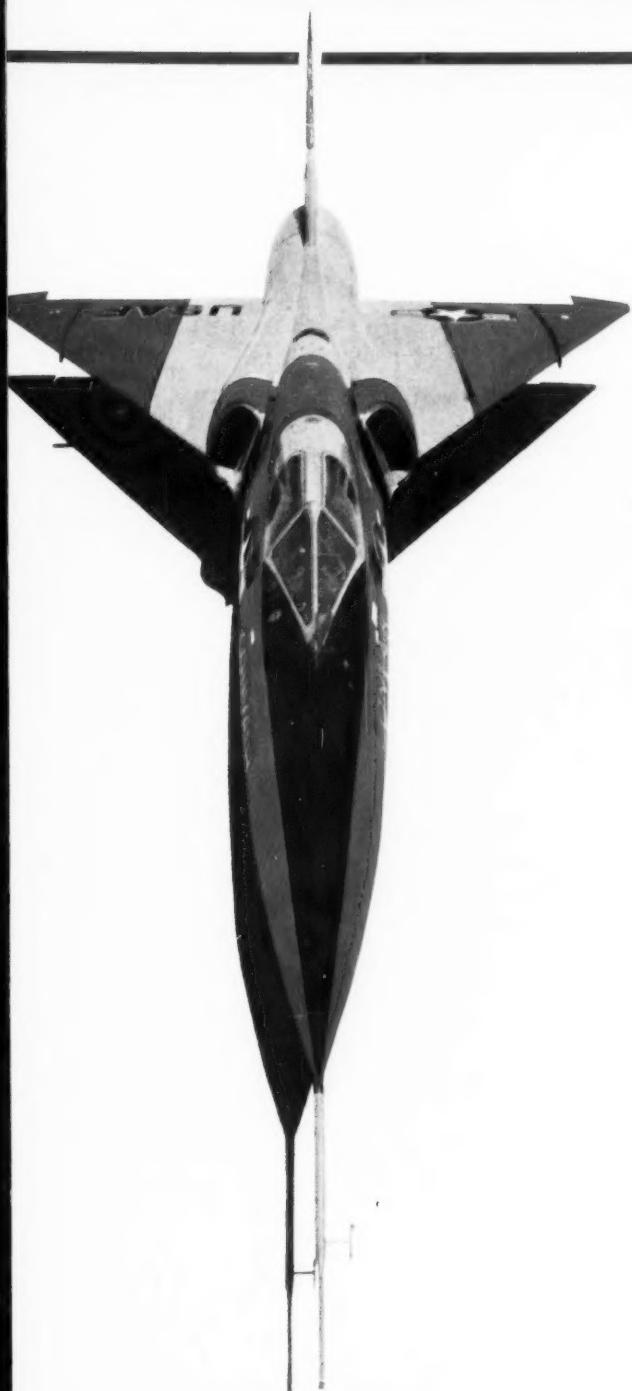


Chemical Week



New blow to boron: Air Force cancels engine, fuel contracts. p. 21

◀ Jet craft spur chemical gains p. 35

Politics for process firms?

Here's one company's course in practical government p. 44

Wasps, deer and moonshine. How plant managers cope with "odd ball" problems p. 54

New argon process pulls profits from ammonia-making "waste" p. 59

August

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Benzalacetophenone
Benzhydrol
Benzhydrylamine
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Benzophenone Tech.
Benzyl Alcohol Tech.
Benzyl Cyanide
Butyroyl Chloride
n-Capric Acid
Caproyl Chloride
Capryloyl Chloride
p-Chlorobenzhydrol
p-Chlorobenzhydryl Chloride
p-Chlorobenzophenone
p-Chlorbenzyl Cyanide
Cinnamoyl Chloride
Dibenzyl Ether
Dicyclohexyl Carbinol
Dicyclohexyl Ketone

INTERMEDIATES

p,p'-Dimethoxybenzophenone
Diphenyl Acetone (unsym)
Diphenyl Methane
Ethyl Formate Tech.
Ethyl Phenylacetate
beta Ionone
Isobutyroyl Chloride
Isovaleric Acid
Isovaleroyl Chloride
Lauroyl Chloride
p-Methoxy Phenylacetic Acid
Methyl Heptenone
Methyl Phenylacetate
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetic Acid
Phenylacetone
Phenylacetyl Chloride
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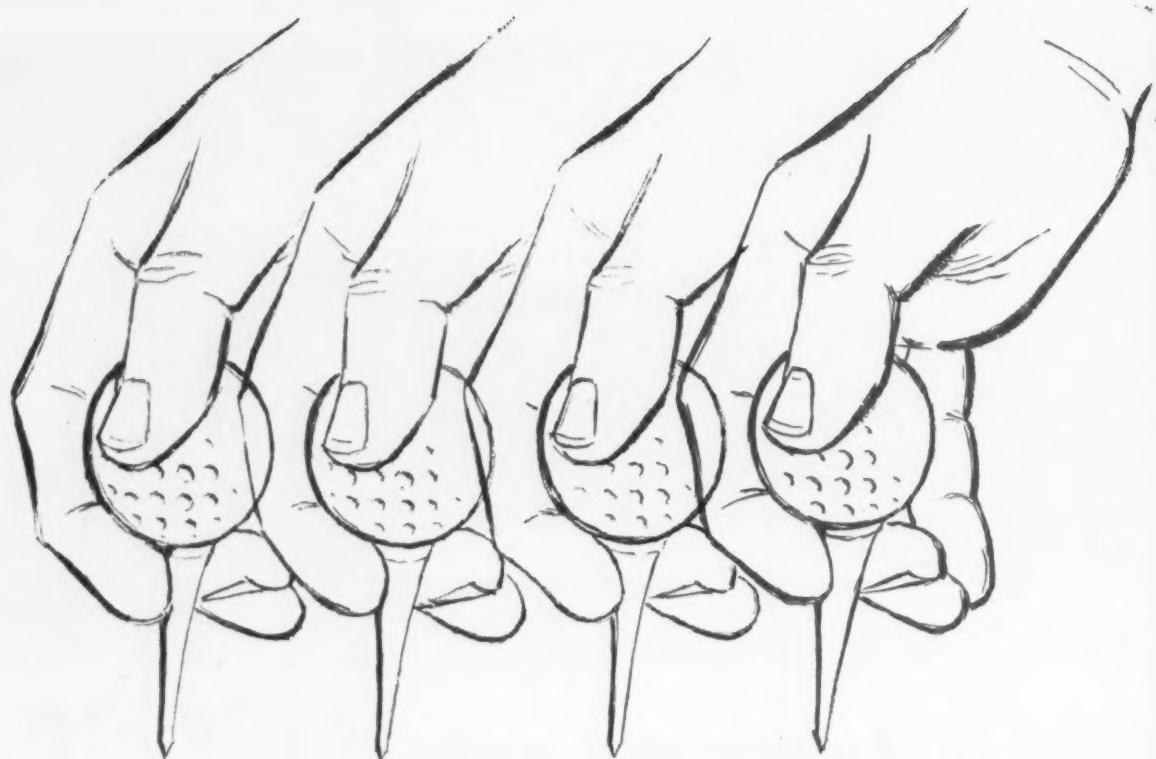
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Chemical Week

TOP OF THE WEEK

AUGUST 22, 1959

- Hazards of defense projects are pointed up by cancellation of boron fuels contracts p. 10
- Michigan Chemical will bolster drug operations as step toward goal of \$24-million sales by '64 p. 23
- More chemical companies report all-time-high sales for first half of this year p. 24
- Barium markets skid for second consecutive year with plummeting need for drilling muds p. 31
- Vacuum metallizing wins new customers as new techniques permit continuous paper coating, "plating" of metal .. p. 63

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Cancellation of boron fuel production contracts is a blow to companies involved. Result: chemical firms may grow more reluctant to take defense contracts.

10 OPINION

15 MEETINGS

17 BUSINESS NEWSLETTER

21 Boron compounds lose out as fuels for "chemical bomber," but makers hold hopes for related military fuel uses.

23 So far, chemical companies haven't been hurt by steel strike, but another month of picketing may cause spot problems.

Michigan Chemical expands in bromine, rare earths, drugs.

24 More on the first-half business boom: late-reporting firms, large and small, show all-time sales highs.

24 Two new CPI firms, Speedry Chemicals and Allied Petro-Chemicals, plan to "go public" via common stock offerings.

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43,485 copies of this issue printed

**Vol. 85
No. 8**

Chemical Week is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Place of publication: 3rd and Hunting Park Ave., Philadelphia 40, Pa. Second-class postage paid at Philadelphia. Subscription: \$3/year in U.S.A. Send subscription correspondence and change of address to Fulfillment Manager, Chemical Week. Please see page 6 for subscription requirements.

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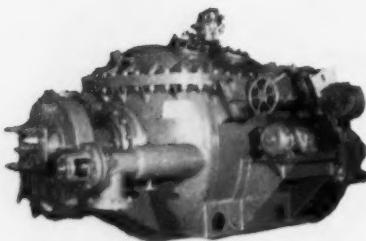
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AUGUST 22, 1959

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1880-1948), founder, EXECUTIVE EDITORIAL CIRCULATION and ADVERTISING OFFICES: McGRAW-HILL BUILDING, 330 West 42nd St., New York 36, N.Y. See panel below for directions regarding subscriptions or change of address. Donald C. McGraw, President; Joseph A. Gerard, Executive Vice-President; Keith Gorrie, Vice-President and Treasurer; J. J. Cooke, Secretary; Nelson Bond, Vice-President, Publication Division; Harry G. Gold, Senior Vice-President; Ralph H. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; A. R. Venezia, Vice-President and Circulation Coordinator.

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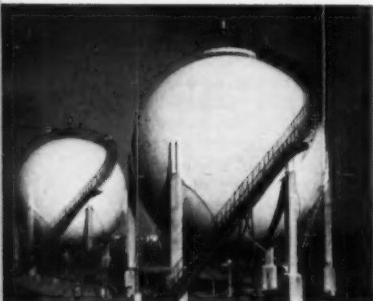
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ETHYLENE OXIDE
SALES SPECIFICATIONS

Water, wt. %	0.03 max. ✓
Aldehyde as acetaldehyde, wt. %	0.010 max. ✓
Acidity as acetic acid, wt. %	.....	0.002 max. ✓
Non-volatile residue, gms./100 ml.	.....	0.010 max. ✓
Inorganic chlorides as Cl, ppm	.....	Nil ✓
Acetylene, wt. %	.....	Water-w
Color	.....	None
Residual odor	
Appearance	Clear and substantially free from suspended matter.

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Essential Chemicals From Hydrocarbon Sources

VIEWPOINT

DEFENSE CONTRACTS held by chemical companies are once again in the news. In this week's issue, we explore the boron-fuel cancellations (p. 21). This story follows up three items in our Aug. 15 issue—on a possible alternative to boron fuels (p. 57), the budget problems (p. 31), and the contract cancellations themselves (p. 20).

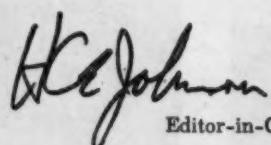
Since the government paid for development as well as for plant construction, companies' out-of-pocket costs will be negligible. Nonetheless, this is a blow to the morale of the companies involved, especially since the cancellations have come just as the plants were hiring people to undertake full-scale operation.

The problems for plant employees are obvious. But the problems faced by the companies are just as real, if less obvious. No firm likes to discharge hundreds of employees or find other jobs for them. But when this distasteful task must be faced through no fault of the company involved, what does it do to the company's reputation as an employer? And in the future, can the company do as good a job in attracting the type of people it wants?

Sudden contract cancellations are, of course, more typical of the aircraft field. And while these companies are just as unhappy about it, it happens often enough so that few firms are at a competitive disadvantage in recruitment because of it.

But in the chemical field where, as in this case, the government seeks out the contractor—not vice versa—the penalty in prestige is unfair.

As we pointed out in this space a year ago (*CW*, Aug. 30, '58, p. 5), chemical companies working in the propellant field can get in on the ground floor of a new technology. But government contracting officials have themselves to blame if chemical firms become more reluctant to accept the contracts they're offered.



Editor-in-Chief

OPINION

Spray-Drying Addenda

TO THE EDITOR: Having been closely associated with spray drying for the past 15 years as a designer, constructor and operator, I find your brief article (*CW*, June 6, p. 43) covers the problem very well.

Might I add that most of the "burned fingers" have resulted from a lack of consideration for the basic fundamentals necessary to control the drying process so as to produce a product to specification. In many early installations the particle characteristic desired was unknown to the designer and the desire to keep first cost to a minimum resulted in the production of relatively small driers, drying in highly turbulent atmospheres and producing very fine particles.

Time and space are essential to the production of specific particle characteristics; and once this is recognized and provided in the design, then long-time production runs that produce a product uniform in size and density—with little or no wall buildup—become the rule rather than the exception.

ALBERT C. FOSTER
Consulting Engineer
Weston, Conn.

TO THE EDITOR: First of all, I would like to compliment you on the excellent article on spray drying. It points out many of the economic advantages of the spray-drying process, which industry in general is only now beginning to fully study and evaluate. . . .

The statement that "one of the problems with centrifugals has been capacity" seems to imply that a single nozzle can handle more than a single centrifugal-wheel-type atomizer. Such an implication, of course, is not correct. A single centrifugal atomizer will handle a greater output than a single nozzle. Nozzles may be used in clusters or in multiples, but centrifugal atomization can also be used with a multiple number of wheels in a single drying chamber. . . .

The statement is also made that "until five years ago, centrifugals were limited to about 6,000 lbs./hour throughput." Bowen offered spray machines over 10 years ago with more than three times this throughput. . . .

As a manufacturer offering spray dryers with centrifugal, two-fluid or pressure nozzle atomization, we feel that the atomization of the feed should not be considered a limiting capacity factor in equipment design.

RALPH T. REEVE
President
Bowen Engineering, Inc.
North Branch, N. J.

'Profitless Tantalum'

TO THE EDITOR: By coincidence, I read your July 4 issue with the interesting article (p. 51) on prospective columbium and tantalum producers on the day that I returned from Japan, where I visited such a facility. If the dozen firms you indicate join the five substantial companies abroad that are already producing tantalum, we may well enter an era of profitless boom in tantalum.

So far as the processes are concerned, you have not emphasized sufficiently that there are two essential steps from the chemical industry's point of view—namely, the separation of the tantalum from the columbium, and the subsequent reduction or purification of the metal. Thus, it is not enough to mention sodium reduction [by one of 12 producers—Ed.], but also mention should be made of what is being reduced and particularly how it was separated as a pure product from its accompanying co-metal (columbium from tantalum) so that it can be reduced effectively.

Many of the methods of producing tantalum now proposed could not be economic tomorrow, when the selling price of the powder is expected to be below \$20/lb. The optimism in the industry is hard to explain, unless the candidates have inexpensive processes really different from other producers', so that they can sell below the manufacturing costs of their competitors and cause a shutdown of uneconomic facilities. A survey we recently prepared for the expansion of a facility using a new process indicates a pure tantalum powder cost price of about \$10/lb., assuming no by-product credit whatsoever for columbium or other metals found in the ore. Even under those circumstances, our client should not feel snug. The big uses for columbium will not materialize in the near future, while ex-

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IBUTYLTIN CHLORIDE • STANNOUS PYROPHOSPHATE
SULFATE • TRIBUTYLTIN OXIDE • STANNOUS
DIPHENYLTIN CHLORIDE • STANNOUS OCTOCHLORIDE
IBUTYLTIN PENTACHLOROPHENATE • TRIETHYL
PHENYLTIN OXIDE • DILAURYLTIN DICHLORIDE
BUTYLTANNONIUM DIACETATE • BIS-DILAURYL
STANNOUS OCTOATE • DIMETHYLTIN OXIDE
MAGNETE • TRIBUTYLTIN DODECYL SUCINATE
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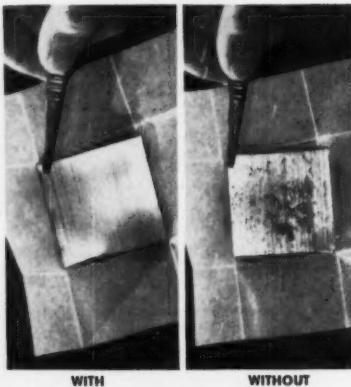
key to new growth in specialty papers that stop rust and mildew

Papermakers with an eye toward higher-margin specialty markets are quietly evaluating the mildew- and rust-suppressing action of a well-established food preservative: sodium benzoate, for many years a standard in jams, jellies, fountain sirups, pickles and sauerkraut. As little as 0.1% protects against microbial spoilage.

Several astute papermakers noted that preserved foods and metal in contact with dilute solutions of benzoate exhibited two phenomena: neither did they mold nor did they rust. This observation sparked several investigations aimed at incorporating sodium benzoate into paper and paperboard wrappings to prevent rust and inhibit mold. Both applications are now developing into full-blown commercial uses.

Rust-No-More Wrap—Intriguing to the specialty papermaker: wrappings that protect metals from rust. Paper with 5% benzoate suppresses the rusting of usually quick-to-corrode mild steel plates. Regenerated cellulose film with benzoate does the same. Even *waxed* paper containing benzoate prevents corrosion. Benzoated wrapping paper has proved effective for protecting steel sewing needles, razor blades, tool heads, machine parts, saw blades, as well as zinc, tin and chromium products.

It is reported that as little as 4% sodium benzoate, based on fiber content, will give substantial anticorrosive properties. A major use of such wrap may develop in the protecting of zinc printing plates; the benzoated wrap



can eliminate the practice of greasing or waxing, protect zinc line and half-tone plates from corrosion in storage.

Ends "Mildew Misery"—The mildew resistance that can be developed in the paper wraps and packaging board has a variety of applications, the most interesting in the field of shipping containers. Food products, such as cheese, candy, margarine, cookies—even cigars—tend to mildew and develop musty tastes and odors in hot humid weather. The problem is particularly acute with high-moisture-content products such as processed cheese, which, even in foil, creates a humid atmosphere inside the shipping cases.

To control this taste- and odor-affecting mildew which is often invisible, papermakers simply place in the paper coating or in the stock a sufficient concentration of benzoic acid. Because sodium benzoate is highly water soluble and the acid isn't—incorporation can be done by adding sodium

benzoate solution at the size press. Since the pH of the sheet is generally brought below 7.0, benzoic acid is then deposited in fibers. The bacterio- and fungistatic paper and board have many possibilities, particularly in packaging comestibles where ever-present microorganisms can ruin the product by causing off odors, discoloration, "mustiness" and even rancidity.

Although a logical place to add the benzoate is at the size press, there are several alternate methods. Some mills without size presses find it easiest to spray a solution of sodium benzoate on the wet web on the wire just before the dandy roll; or, alternately, to use it at the calender stack. Another procedure for benzoating the paper is to run the finished paper through rollers into a 60-80°C., 30% solution of sodium benzoate, passing through squeeze rolls and drying.

But, whether "sized-in" the fiber, impregnated, or tacked on in the coating—benzoate is providing paper and paperboard with new specialty jobs that profit both the maker and the user.

For further information on sodium benzoate use in making mildew- and rust-preventing paper and board, request a copy of Specialty Data Report CS-11, SODIUM BENZOATE IN PAPER AND PAPER-BOARD. Write today to: Monsanto Chemical Company, Organic Chemicals Division, St. Louis 66, Missouri.

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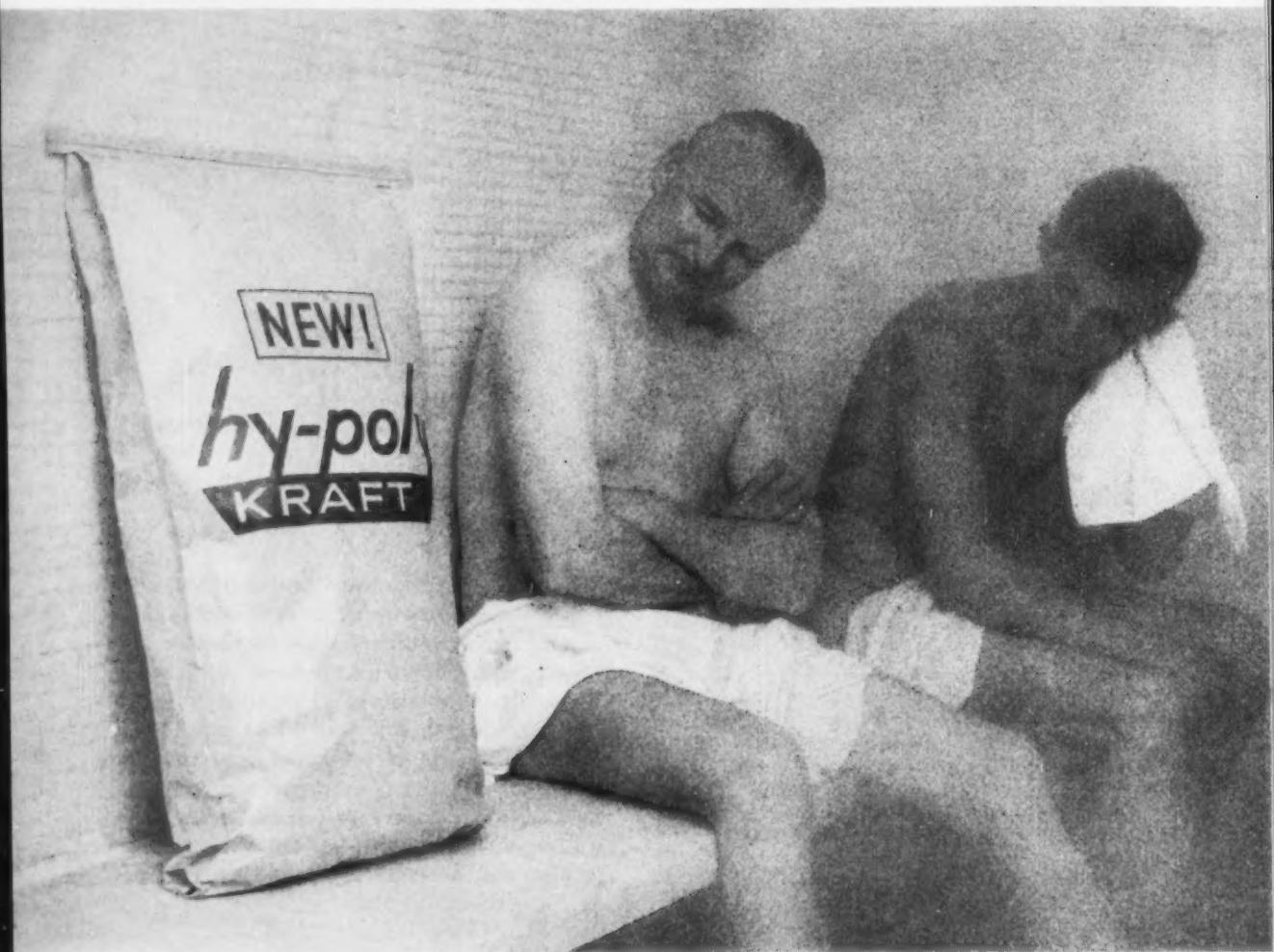
For complete information, see Chemical Materials Catalog, pages 202-203



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THE multiwall bag you see taking a Turkish bath in our picture contains calcium chloride.

We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2 1/2 times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

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See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

OPINION

tensive research is being done on replacing tantalum by a cheaper metal in capacitors, which may result in the loss of an important market.

As usual, CHEMICAL WEEK has not been afraid to attack a complicated topic and has done a good job. The field is so active that you will doubtless have more articles on it in the near future.

ROBERT S. ARIES
Aries Associates, Inc.
Stamford, Conn.

MEETINGS

Gordon Research Conferences: At Colby Junior College, New London, N.H.—instrumentation, Aug. 24-28; cancer, Aug. 31-Sept. 4. At New Hampton School, New Hampton, N.H.—statistics in chemistry and chemical engineering, Aug. 24-28; chemistry of adhesion, Aug. 31-Sept. 4. At Kimball Union Academy, Meriden, N.H.—photonuclear reactions, Aug. 24-28; molten salts, Aug. 31-Sept. 4.

American Rocket Society and Northwestern University, gas dynamics symposium, Northwestern University, Evanston, Ill., Aug. 24-26.

Chemical Institute of Canada, Physical Chemistry Subject Division; symposium on mass spectrometry in chemistry; McMaster University, Hamilton, Ont., Aug. 30-Sept. 1.

1959 Cryogenic Engineering Conference; subjects: cryogenic processes, applications, equipment, properties; University of California, Berkeley, Sept. 2-4.

Technical Assn. of the Pulp and Paper Industry, fundamental research—wet-strength conference, Institute of Paper Chemistry, Appleton, Wis., Sept. 9-11.

Armed Forces Chemical Assn., 14th annual meeting; theme: future chemical requirements of the armed services; Statler-Hilton Hotel, Washington, D.C., Sept. 10-11.

Society of the Plastics Industry, Midwest section conference, French Lick Sheraton Hotel, French Lick, Ind., Sept. 10-11.

American Ceramic Society, structural clay products division meeting, Alfred University, Alfred, N.Y., Sept. 10-12.

American Chemical Society, national meeting, Atlantic City, N.J., Sept. 13-18.

Technical Assn. of the Pulp and Paper Industry, ninth corrugated containers conference, Jung Hotel, New Orleans, Sept. 15-17.

Canadian Agricultural Chemicals Assn., seventh annual meeting and conference, Chateau Frontenac, Montreal, Sept. 20-23.



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Business Newsletter

CHEMICAL WEEK
August 22, 1959

A Congressional probe of the boron fuel contract cancellations (*see also pp. 10 and 21*) is in the works. Late Monday evening, Chairman Overton Brooks (D., La.) of the House Space Committee announced his group will investigate the decision to write off the boron fuel program after spending some \$250 million. Hearings may come before Congress adjourns for the year.

Brooks said his investigation will be based on the report that the cancellations were caused, at least in part, by Air Force and Navy determinations that they had no requirements for such a fuel. The committee also intends to look into the plans of the National Aeronautics and Space Administration, which in a '59 report to Congress, said it was co-operating in a "high-priority" boron development program.

New projects that indicate current industry strategy: American Potash & Chemical is increasing sodium chlorate capacity at Aberdeen, Miss., from 15,000 to 22,500 tons/year "to satisfy increasing consumption by the pulp and paper industry"; Union Carbide Nuclear Co. will expand its tungsten refining plant at Bishop, Calif., to produce high-purity ammonium paratungstate; Uranium Reduction Co. is allotting \$2 million for expansion of its plant at Moab, Utah; Standard Oil of California will put up the West Coast's first maleic anhydride plant (*see Market Newsletter*, p. 51); and Amoco Chemicals will build a semicommercial plant to produce trimellitic anhydride (*see Technology Newsletter*, p. 41).

The "Big Three" soap producers have won another round in the antitrust suit that has been grinding slowly onward in federal district court at Newark, N.J. (*CW, Jan. 31, p. 80*). Late last week, Judge Richard Hartshorne again firmly upheld the contention by the three corporate defendants—Colgate-Palmolive, Lever Brothers, and Procter & Gamble—that the Justice Dept. cannot use in a civil suit the evidence that it obtained through grand jury action in a criminal proceeding. If this ruling stands, it would seem to knock out most of the evidence on which this suit is based. Consequently, the Justice Dept.—which has been working on this case more than seven years—is expected to appeal.

One company riding the crest of the chemical industry boom: Dow Chemical, which increased its sales 21.6% and its earnings more than 100% in the six months ended May 31. In its entire fiscal year (also ended May 31), Dow hoisted sales more than 10%, to a new high of \$705.4 million, and raised after-tax earnings 37%, to \$62.9 million.

As company executives had predicted, magnesium made the best showing among Dow's principal product lines. But chemicals, plastics

Business Newsletter

(Continued)

and agricultural chemicals also gained. The year's total sales breakdown: chemicals, 51%; plastics, 35%; magnesium, 8%; ag chemicals, 6%.

The annual report to stockholders—issued late last week—shows that capital spending dropped to \$59 million during the year after having hit an all-time peak of \$185 million in the 1957-58 fiscal year. This year's figure is expected to be about \$60 million.

Again the Soviet bosses are cracking the whip on their chemical industry cohorts. An article in the U.S.S.R. government's *Pravda* upbraids the chemical industry for "serious shortcomings"—particularly, failure to expand as fast as ordered in the seven-year plan.

And this week, the U.S.S.R.'s chemical organization hit a new stumbling block: unwillingness of U.S. chemical companies to open their plants and laboratories to a delegation of 19 Soviet chemists that started touring this country this week. The State Dept. had broached this matter to the Manufacturing Chemists' Assn., which put the question to its member companies and got a generally negative response. At press time, the visitors had only three definite bookings: one fertilizer plant, one college, and one big auto plant.

But the Soviet bloc continues to get chemical aid from other sources. Rumania is reported to have placed orders for at least \$15 million worth of British-made oil, chemical and textile equipment. And Italy's Montecatini has a group of representatives in Moscow, reportedly negotiating on process licenses for acetylene, ethylene, maleic anhydride and titanium dioxide. Montecatini said it could not confirm press reports on the deal.

Are U.S. missile-makers heading toward captive production of chemical fuels? The question is prompted not by the Pentagon's recent cancellation of the two big boron fuel contracts (*p. 21*) but by Aerojet-General's disclosure to *CW* this week that it's readying a new pilot plant for production of nitro compounds at Sacramento, Calif.

The list of compounds to be produced is classified information, but Aerojet spokesmen describe the pilot plant as a "versatile chemical facility capable of producing a wide variety of chemicals useful in solid propellents for advanced missile applications."

The project is said to be in "transition stage" from a similar operation previously conducted at Aerojet's Azusa plant.

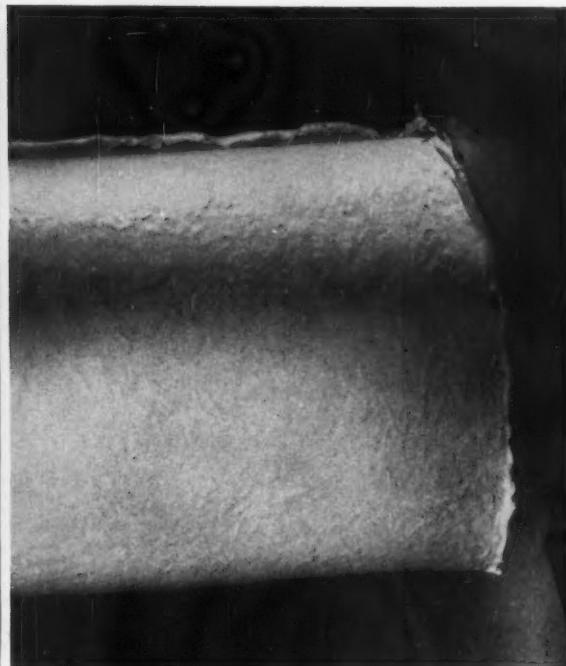
"Continental manners" for executives in overseas assignments?

Not exactly; but with U.S. industry greatly increasing its international activities, American University's School of International Service (Washington) is going to offer a special orientation course for executives—and their wives—who will be representing U.S. business abroad. First of the six-week sessions will begin Sept. 14. Fee: \$500.

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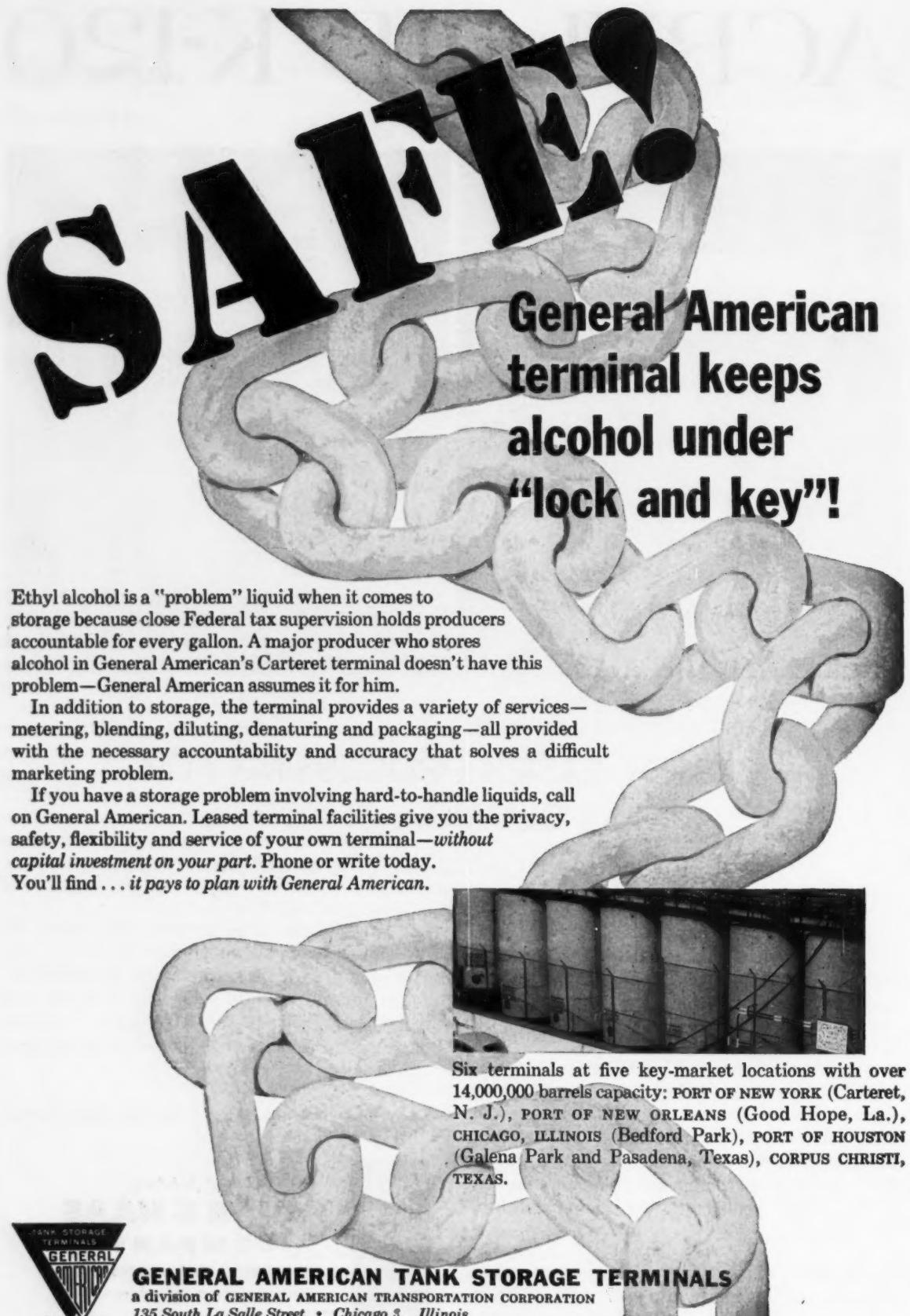


Chemicals for Industry

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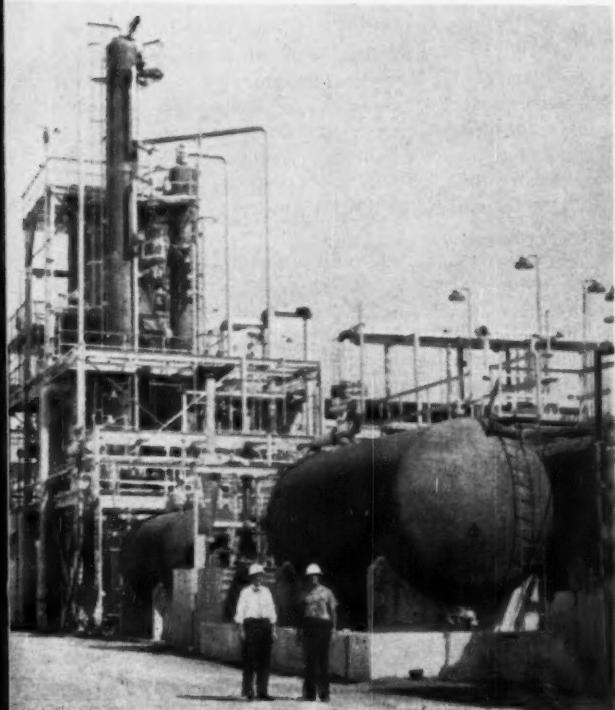


GENERAL AMERICAN TANK STORAGE TERMINALS

a division of GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street • Chicago 3, Illinois

August 22, 1959

Cutback Creates Costly White Elephants



WIDE WORLD

\$45 Million, Olin Mathieson at Model City

\$38 Million, Callery Chemical at Muskogee



Big Tab for Aborted Borane Plants

Last week, the Air Force and Navy decided not to open their big plants (above) for making triethyl decaborane. It was a sudden, unexpected move that has cast a heavy shadow over the future of the boranes as fuels. The plants were scheduled to open next month.

It had been apparent for some time that the Navy had lost interest in boron fuels and was trying to talk the Air Force into taking over the operation of the Muskogee, Okla., plant (*CW*, July 11, p. 23). But the Air Force continued to push development of General Electric's borane-burning J93-5 (Dash Five) engine that would power the B-70 (chemical bomber).

The Dash Five engine was scheduled to use a hydrocarbon fuel in the turbojet portion, boranes in the afterburner.

Then, late last Monday afternoon, the Air Force started notifying contractors that it was canceling the engine development program, halting operations at Olin Mathieson's \$45-million Model City, N.Y., boranes plant. The Navy's decision to cancel operations at Callery's \$38-million plant at Muskogee followed almost automatically, the next day.

Research and development contracts on boron fuels were not affected by the decision. And as of late last week, at least, neither of Arthur D. Little's process-evaluation con-

tracts were hit. These contracts cover: (1) a 60-day study—due to be completed next month—to determine which of the two big plants (Olin's or Callery's) should be kept open if a decision were reached to operate only one facility; (2) an 18-month evaluation of the various fuel processes.

The Air Force says that its decision to scrap the current program was primarily an economic one. General Electric has had parallel engine-development programs for the B-70 and the F-108—the Dash Five and the Dash Three (J93-3) are subjects of this twin effort. The latter uses a hydrocarbon fuel in both the turbojet and afterburner.

But right now, defense officials are

desperately trying to hold the budget to \$41 billion for this, and the next, fiscal year. The Air Force concluded that the boranes do not give an increase in performance commensurate with their added cost. So it cut back the Dash Five, is continuing with the Dash Three.

It will discuss neither the cost of the fuels nor the increased performance available from the boranes. However, it does say that operating the Model City plant for a year would have cost some \$20 million. At a capacity of 5 tons/day, that comes to a cost of about \$5/lb. The Navy estimate was \$18 million to run Callery's plant, also rated at 5 tons/day.

Boranes in the fuel were supposed to add 40% to the range of an aircraft. But since they were to be used only in the afterburner of the Dash Five, such a boost could not be expected in this case. It now seems probable that the Dash Five promised a performance bonus (over the Dash Three) of approximately 10%.

What It Means: There is some speculation that the round of contract cancellations is the prelude to a complete jacking of the B-70 program. The bomber is not scheduled to become operational before 1963 or '64. Defense Secretary McElroy has said that it would cost \$5-10 billion to get a worthwhile number of B-70s.

The boranes program is only a fraction of that sum, of course. But it still represents a tremendous expenditure. The Air Force has plowed approximately \$100 million into the fuel development program—in plants and research and development contracts. The engine program may have cost an equivalent amount; Air Force had earmarked the Dash Five for \$9 million in fiscal 1960.

Taking into account the Navy expenditures—also considerable—the program probably cost \$250 million.

There is no question but that the boranes as fuels have received a serious setback as a result of the Air Force decision. But it doesn't necessarily mean that they can be counted out as fuels of the future. Some Defense Department fuel experts are frankly disgruntled with the decision, feel the boranes have proved their merit.

Says one: "The technical people

liked them, the budget people didn't. The technical people lost."

As late as last February, the President said (in a report to Congress on activities of the National Aeronautics and Space Agency) that research and development on high-energy fuels for air-breathing engines "continues to be a high-priority program . . . Boron now appears feasible as a high-energy fuel."

Stauffer-Aerojet is continuing its work on the boranes, expects to start up its large Sacramento, Calif., pilot plant in a few weeks. AFN is proceeding with its development work. Olin Mathieson and Callery are both continuing borane work, though not at the big plants. And both, of course, own plants that can turn out fuels for developmental purposes.

Some feel that the big future—if any—for the boranes will be in ramjets, where they can more clearly demonstrate their superiority over hydrocarbons. There's continued interest, too, in boranes as rocket propellents—both liquid and solid. While it cautions against overoptimism, the NASA says it is working on boron fuels in conjunction with a "novel type of oxidizer" as a rocket propellant. Both Olin Mathieson and Callery have developed solid boron-based rocket fuels.

Search for Substitutes: And whatever happens to the boranes, the Air Force is working hard on other facets of the fuel program. The Dash Three is scheduled to use JP-6,* currently the best hydrocarbon available for the job. But it is earnestly seeking out better ones.

Monsanto is working with the Air Force in an effort to determine the optimum performance that can be expected from a hydrocarbon. It has tabulated the physical properties (e.g., volatility, density, specific heat and thermal stability) of 6,000 pure compounds (as opposed to mixtures that are typically found in a refinery cut). From the 6,000, it has come up with 50 that are the most likely candidates. Some are on the list because of their heat content, thermal stability or density; others because they are abundant and can be produced cheaply. Monsanto will tabulate and aid in preliminary evaluation of fuels for

* The JPs are all kerosene-type fuels. JP-4 is currently the workhorse. JP-5 is the Navy's fuel; it has somewhat lower volatility for storage aboard ships. JP-6 is the newest family member, has higher thermal stability.

the Wright Air Development Center's Propulsion Lab.

Another part of the hydrocarbon picture involves the investigation of naphthalenes (*CW Technology Newsletter*, Aug. 15), both pure compounds and refinery cuts, as fuel. Ashland Refining is supplying 100,000 gal. of a synthetic, which it won't identify. Safe bet: decahydronaphthalene with small amounts of diethylcyclohexane. The latter is added to improve viscosity. Esso is supplying a naphthenic cut (Stock G) for evaluation. Standard of Indiana and other companies are working in the field.

One of these newer fuels could well be integrated into the Dash Three program. And, in any case, the use of a pure chemical for jet fuel would open a big business for the chemical industry. Jets flying at three to five times the speed of sound could burn 250 million gal./year. Fuels could probably sell for as much as \$1/lb., the target price for the boranes in large production. (Du Pont now sells its Decalin decahydronaphthalene for 69¢/lb.) That means a \$1.5-2-billion business, an incentive that helps compensate for the not-inconsequential risks that are involved.

On-the-Road Costs Up

Costs of keeping chemical salesmen on the road are now topping the 9¢/mile mark.

According to a survey of more than 300 companies by Wheels, Inc. (Chicago)—a major auto fleet leasing firm—mileage payments to chemical industry salesmen driving their own cars on company business have reached an average of 9.13¢/mile in the U.S. and the national average for all industries is also at an all-time high—8.91¢/mile, compared with 8.22¢/mile last year.

This year, 36% of the chemical companies surveyed paid 9¢/mile and 23% paid 8¢/mile. Two years ago, only 9% of companies surveyed by the Drug, Chemical & Allied Trades Section of the New York Board of Trade allowed charges greater than 8¢/mile; and 51% of the companies then surveyed allowed only 6-8¢ (*CW*, Aug. 17, '57, p. 69).

Wheels' interpretation: companies now are trying to hold present salesmen and increase sales forces.



Steelworkers' roadblock: How much will it impede chemical activity?

Strike Takes Chemical Toll

As the steel strike rolls into its second month, chemical companies are bracing for any of these possible contingencies:

- Settlement of the strike within the next few weeks—in which case industrial production probably would hum along in high gear for the rest of this year and on into '60.

- Federal intervention in the next week or so to suspend the strike for 80 days (under the Taft-Hartley law's national emergency clause). This would enable the big steel companies to haul in their winter's iron ore supplies before the Great Lakes shipping season ends.

- A negotiated or mediated truce between the steel companies and the steel union—likewise intended to let the steel companies stock up on ore before cold weather forces Great Lakes vessels into their annual winter hibernation.

- A long and bitter steel strike, lasting into October or even beyond—in which case industrial sales and earnings in the July-December period would surely fall short of their record first-half levels (*p. 24*).

Not Hurt Yet: Chemical management men queried by *CW* throughout the country agree that the most bothersome aspect of the strike so far is that naphthalene and phthalic anhy-

dride supplies—already short before the strike—are now becoming tighter. These products have been coming into the U.S. from Europe in increasing volume during recent weeks, but it appears that imports will not be adequate if demand continues at recent levels.

Petroleum refiners have increased their output of some other chemicals—e.g., benzene, toluene, xylene—enough to make up for the lack of production from coke ovens.

Sales Off Seasonally: Most large chemical companies acknowledge that their July-August sales are lower than June's peak volume, but say they don't know how much of the dip can be attributed to the steel strike. One diversified chemical company says its recent sales volume is down 5 to 8%, but adds that this could be considered a normal, seasonal fluctuation. "In July of last year," a spokesman told *CW*, "our sales were off 7%."

One area in which the steel strike has impinged on chemical sales, of course, is the mineral acids. One estimate: shipments of sulfuric and hydrochloric acids are off 10%.

Up to now, the steel strike hasn't caused any interruption or lag in chemical companies' expansion and modernization programs. But one large chemical maker figures that construction of major projects contracted

now may be delayed until two months beyond the strike's duration.

Generally, chemical firms and their suppliers appear to have prepared for this steel strike more providently than in the '53 and '56 strikes. The statement by Union Carbide comes close to the consensus: "We anticipate no substantial effect on the year's operations if the strike doesn't go into the fourth quarter."

Sales Goal: \$24 Million

In its first appearance before New York security analysts, Michigan Chemical Corp. last week painted a rosy picture of expected sales growth, now that the firm has dropped its war-inspired DDT operations.

Ted Marvin—credited by many with having stiffened Michigan's managerial backbone since he became president in '54—cited a sales goal of \$24 million by '64, with a 10% after-tax profit margin. This compares with '58 sales of \$9.3 million and a profit margin of 3.9%.

Marvin bases his projections on a "growing, revitalized" brine chemicals market and a "strong scientific and practical position in rare earths." In the '64 forecast, however, the firm expects less than 10%, "probably less than 5%," of sales to stem from the rare-earths business.

Where will Michigan concentrate? Perhaps a good indication lies in Marvin's outspoken enthusiasm for the company's line of pharmaceutical products and the company's aptitude for making fine chemicals. Says Marvin: "We're planning to widen our participation in these through construction of additional capacity this year. And we're now firming up proposals for the acquisition of specialized pharmaceutical distribution facilities."

This month, Michigan is picking up the proceeds of an unsecured \$4.6-million long-term loan by New York Life Insurance Co. to replace its \$2 million in notes payable, used for interim financing of the company's magnesium-from-sea-water plant at Port St. Joe, Fla. The latter started up last month.

Exclusive of the firm's current and expected expenditures at Port St. Joe, capital outlays for the next two or three years are expected to be \$1.5-2.5-million/year. The firm hopes to obtain these funds internally.

MORE CPI FIRMS SCALE NEW HEIGHTS

(All dollar figures in millions)

	SALES		EARNINGS		MARGINS	
	1st half '59	Change from '58	1st half '59	Change from '58	1st half '59	'58
Amer. Agr. Chem. ⁽¹⁾	\$91.5	+13.9%	\$5.1	+ 3.7%	5.5%	6.1%
Beryllium Corp.	10.7	+61.0%	0.8	+1,397.5%	7.5	0.8
Brush Beryllium	8.3 ⁽²⁾	+50.9%	0.8	+ 328.0%	9.7	3.4
Celanese Corp.	127.6	+22.9%	10.4	+ 83.2%	8.2	5.5
Chemetron Corp.	64.4	+11.9%	2.5	+ 34.6%	3.9	3.2
Chemway Corp.	4.0	+10.5%	0.1	+ 24.0%	2.9	2.6
Columbian Carbon	36.6	+16.0%	3.5 ⁽³⁾	+ 135.2% ⁽³⁾	9.5 ⁽³⁾	4.7 ⁽³⁾
Dixon Chem. & Research	2.1	+63.9%	0.2	(4)	9.6	(4)
Dow Chemical ⁽⁸⁾	705.4	+ 9.3%	62.9	+ 36.6%	8.9	7.1
Food Mach. & Chem.	184.1	+17.5%	11.5	+ 38.9%	6.2	5.3
Int'l. Min. & Chem. ⁽¹⁾	112.6	+ 8.6%	5.8 ⁽³⁾	+ 10.6% ⁽³⁾	5.2 ⁽³⁾	5.1
Jeff. Lake Sulphur	(5)	...	0.2	(4)	...	...
Kawecki Chemical	3.5	+86.5%	0.2	+ 378.0%	6.8	2.7
Lehn & Fink ⁽¹⁾	32.6	+ 7.1%	1.3	+ 21.9%	4.0	3.5
Lilly, Eli	94.1	+ 7.4%	12.0	+ 3.7%	12.8	13.2
Minn. Mining & Mfg.	210.7	+19.5%	27.4	+ 54.3%	13.0	10.1
Nalco Chemical	24.2	+33.3%	2.2	+ 46.1%	9.1	8.3
Pacific Chem & Fert.	10.8	+11.9%	0.2	(4)	2.2	(4)
Pitt. Coke & Chem.	37.9	+75.8%	1.7	+ 288.5%	4.5	2.1
Pitt. Plate Glass	279.9	+12.1%	20.0	+ 56.9%	7.2	5.1
Polymer Corp.	3.3	+57.3%	0.2	+1,920.7%	7.0	0.5
Stepan Chemical ⁽⁶⁾	8.7	...	0.5	...	5.4	6.0
Sterling Drug	102.8	+ 5.3%	9.5	+ 15.3%	9.2	8.4
U.S. Borax & Chem. ⁽⁷⁾	47.3	+18.9%	4.7	+ 213.2%	9.9	3.8
Vitro Corp.	27.6	-17.3%	0.3	- 2.2%	1.0	0.8

(1) For fiscal year ended June 30. (2) Estimated by CW. (3) Excluding nonrecurring profits and debits. (4) Company had deficit in first-half 1958. (5) Not reported. (6) Including Maywood Chemical operations for May and June '59; no comparable figures for '58. (7) For nine months ended June 30. (8) For fiscal year ended May 31.

At a Summit: 24 Out of 25

Here's the latest sampling of chemical company earnings—for 25 late-reporting corporations with annual sales ranging from less than \$5 million to more than \$700 million. It further underscores the verdict arrived at several weeks ago by the rest of the industry: the first six months of this year, and especially the spring quarter, were doubtless the greatest ever.

With only one exception, these companies boosted their sales by amounts up to 87%, and their gains in earn-

ings ranged more than 20-fold (*table, above*).

Six of the concerns increased their sales totals by 50% or more in the periods reported on last week; and seven others more than doubled their net incomes.

Higher, more economic operating ratios and other efficiencies in effect this year show up in improved profit margins. For the year-ago periods, only 10 of these 25 companies had earnings-to-sales ratios of 5% or more; this year, 17 made the grade.

Small Firms Go Public

Two specialized CPI concerns—Speedry Chemical Products, Inc., and Allied Petro-Chemicals, Inc.—are going public this month by offering new blocks of common stock.

Speedry—a producer of special-purpose inks and related products—was formed last month through merger of two companies that were organized in '46 and '47 by Sidney Rosenthal, now president of Speedry.

This company claims to be "the largest U.S. manufacturer of specialized marking, stamping and stenciling inks created for use with manually operated special devices." Headquarters and principal plant are in Queens, New York City.

Rosenthal now owns all the outstanding stock—166,666 Class A shares and 500,000 Class B shares. In the offering, Rosenthal will put all of his Class A shares on the block, and the company will put up 51,667 new shares of Class A stock. Proposed offering price: \$6.625/share.

Of the net proceeds from this offering, Speedry plans to spend about \$85,000 for equipment so that it can begin manufacturing in Chicago (where it now has distribution facilities) and \$100,000 to set up a plant in England. It already has a branch plant in Albuquerque, N.M.

New Issue: Allied Petro-Chemicals—which changed its name two months ago from Allied Petroleum Corp.—has been in business since '51. It re-refines and blends previously used petroleum and petrochemical products such as lubricants, antifreeze, brake fluids, deodorants, drycleaning fluids, petroleum additives and insecticides. It claims to be one of the largest of the approximately 150 re-refiners in the U.S., and the largest one in the Southeastern states. Headquarters are at Overbrook Hills, Pa., and refinery is in Jacksonville, Fla.

The company now proposes to offer to the public 100,000 new Class A shares, probably at \$4/share. Net proceeds—estimated at \$298,000—will be used for increasing inventory, training additional salesmen, research and development of new products, plant improvements and expansion, addition to working capital and payment of certain liabilities.

COMPANIES

Union Carbide Nuclear Corp.—a division of Union Carbide—has been given a four-year extension on its contract to operate four Atomic Energy Commission facilities: the gaseous diffusion plant, fabrication development plant and national laboratory at Oak Ridge, Tenn., and the gaseous diffusion plant at Paducah, Ky. The cost-plus-fixed-fee contract now runs to June 30, '64.

Vita-Safe Corp. (New York), which last year did about \$10-million business, mostly in production and sale of vitamin preparations, has been acquired for stock and cash by Consolidated Sun Ray, Inc. (Philadelphia), a retail drug and variety store chain.

Simpson Paper Co. (Everett, Wash.) and Lee Paper Co. (Vicksburg, Miss.)—two of the nation's oldest paper manufacturers—may be merged to form a new Washington corporation that would be known as Simpson Lee Paper Co. Simpson Paper is a division of Simpson Timber Co. Lee stockholders will vote on the plan this month.

Pennsylvania Glass Sand Corp. (Pittsburgh)—producer of silica, abrasives and related products—has purchased Floridin Co. (Tallahassee, Fla.). The 49-year-old Florida firm—whose stock had a market value of about \$2.6 million prior to the transaction—mines and processes fuller's earth in Georgia and Florida.

EXPANSION

Polyethylene Film: Du Pont will build its first major polyethylene packaging film plant at its Spruance Works near Richmond, Va. The new unit—to be operated as part of the cellophane plant there—is scheduled for operation early in '60. Currently, Du Pont is turning out limited quantities of polyethylene packaging film at a pilot plant at Orange, Tex., and is producing polyethylene film for industrial and agricultural applications at Buffalo, N.Y.

Synthetic Fiber: Union Carbide is seeking a location for its yet-undisclosed synthetic fiber project. The company will not exercise its purchase option on the American Viscose plant at Roanoke, Va., which was closed late last year (*CW, July 25, p. 33*).

Nitric Acid: Cyanamid of Canada Ltd. (Montreal) is starting a multimillion-dollar expansion and modernization program at Welland, Ont. The nitric acid plant—largest in the Cyanamid organization—will be enlarged; it has been operating at nearly double its rated capacity.

This plant will switch to using natural gas from

western Canada as raw material for its most important product, prilled ammonium nitrate. This operation now is based on coal shipped in from the U.S.

Resins for Finishes: Directors of the Glidden Co. (Cleveland) have approved construction of a \$600,000 synthetic resin reactor at the Cleveland plant. It will be the fourth unit in Glidden's \$2.25-million resin expansion program. Other universal-type resin reactors have been authorized for Glidden plants in Chicago, San Francisco and Toronto. The units—designed to produce "all kinds of resins essential to the paint, varnish and plastics industries"—are scheduled to be in full operation by late '60.

Plastic Bottles: Plax Corp. (Bloomfield, Conn.) will enlarge its plastic bottle molding facilities at Deep River, Conn., from 88,000 to 128,000 sq. ft. Cost: \$325,000. Completion date: January.

FOREIGN

Chemicals, Rubber/Egypt: Misr Chemical Products Co. has started construction of its \$5.7-million caustic soda-chlorine plant at Alexandria—said to be the first soda plant in the Middle East. Initial capacity: 20,000 tons/year of caustic, 17,500 tons/year of chlorine. Ultimately, capacity may be tripled, depending on local and export consumption.

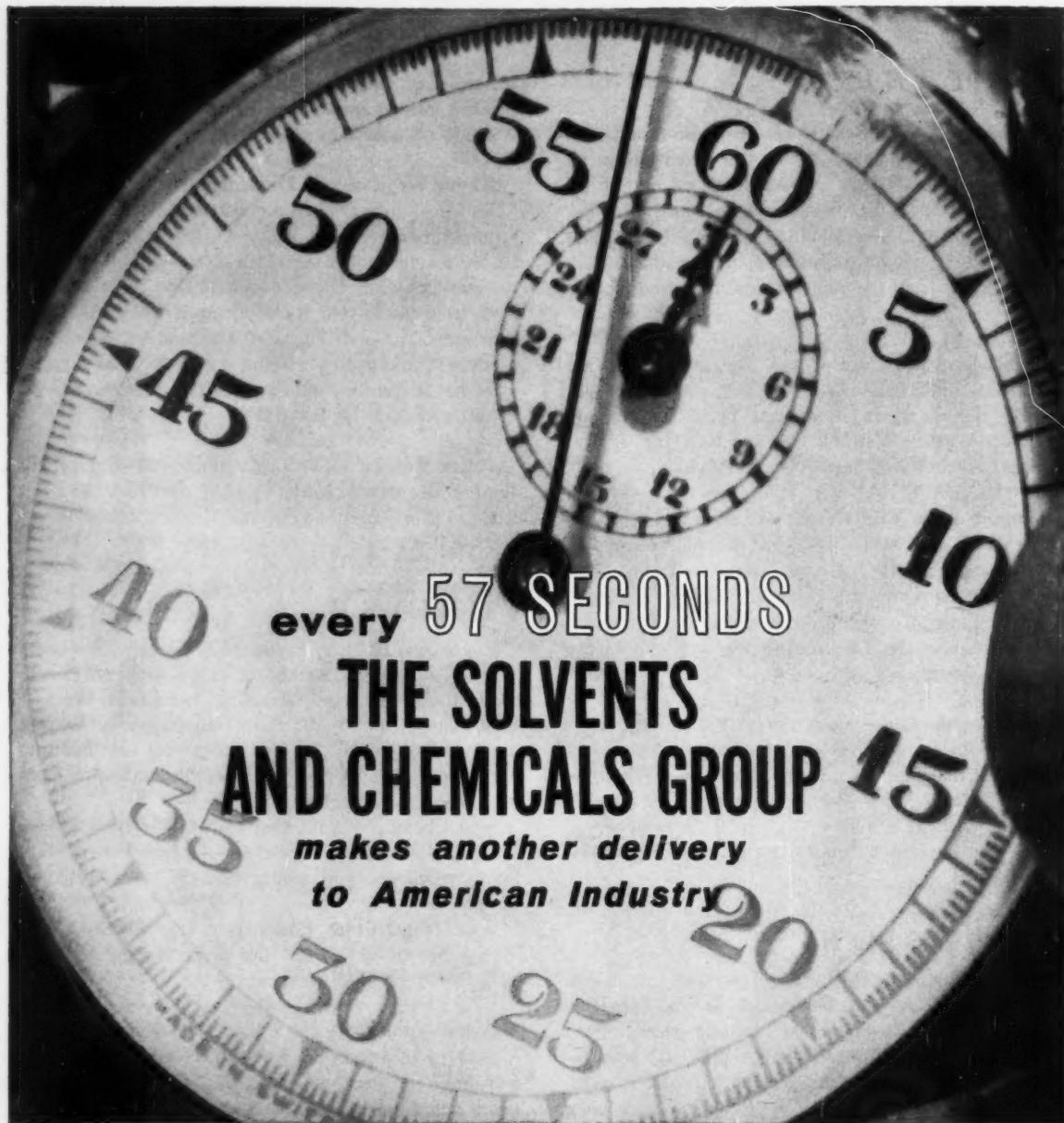
Misr Chemical—a member of the Misr Bank group, and capitalized at \$11.6 million—is now investigating the possibility of producing calcium superphosphate for export.

And Transport & Engineering Co. (TRENCO) is expanding its rubber and tire plant at Smouha from 180,000 to 300,000 tires/year.

Nylon Yarns/Mexico: Celulosa y Derivados, S.A. (Cydsa), and Algemeene Kunstzijde Unie N.V. (AKU) will build a plant at Monterrey for production of nylon-6 and nylon-66 textile and tire-cord yarns. Technical assistance will come both from AKU and from that Dutch company's U.S. affiliate, American Enka.

Chemicals, Petroleum/India: India's first sodium hydrosulfite plant—built for J. K. Industries—has gone onstream at Bombay; and a second facility is expected to begin production next month in south India. Both plants are rated at 5-tons/day capacity and are built by Krebbs, a Swiss concern, which has supplied the equipment on a deferred-payment basis. These plants use the amalgam rather than the zinc process.

And Burmah Oil Co. has awarded a \$5.6-million contract for a 270-mile pipeline to connect the recently discovered Nahorkatiya oil fields with the 750,000-ton/year refinery being built by the Indian government near Gauhati.



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Washington Newsletter

CHEMICAL WEEK
August 22, 1959

House and Senate conferees must close a big gap on the labor bill. Politically, there are high stakes involved.

The House bill is tougher than the Senate's on these counts:

- Virtually all secondary boycotts would be eliminated.
- Picketing for organizing purposes would be banned if the union can't show evidence that employees want to be organized.
- State agencies could move into "no man's land"—the smaller labor disputes that the National Labor Relations Board won't handle.

The House vote for this tough bill was a big victory for Eisenhower and a real blow to labor's political prestige. It shows that labor unions can't control a Congress they had a big hand in electing.

Presidential hopeful Sen. John Kennedy is in a particularly touchy spot. The bill bears his name in the public mind. If the tough House measure isn't softened considerably, Kennedy will be hurt with labor. If the two houses stalemate, independents will consider Kennedy's labor reform efforts a washout and blame the Democrats. The conference committee is dominated by proponents of a tough bill.

Labor has fared better at the bargaining table than in Congress. Although wage increases this year have been modest, new fringe benefits will add to the upward pressure on costs.

Nearly three-fourths of the settlements this year liberalize fringe benefits. Extension of supplemental unemployment benefits, a seventh paid holiday, and more liberal vacations are common.

Even more significant for the future are several contracts that are likely to set patterns for other industries. For instance:

- West Coast longshoremen won an "automation fund"—costing shippers \$1.5 million this year—to ease hardship on displaced workers.
- Southern California retail workers got a new health fund for dental and psychiatric care.
- Ladies' handbag makers will get 2½ hours overtime pay per week if the company imports finished goods from abroad.

Control over radiation safety will be shifted away from the Atomic Energy Commission to a Cabinet committee and the Public Health Service.

The President's order charges the Cabinet committee (Secretaries of Defense; Commerce; Health, Education & Welfare, plus the AEC chairman) with setting standards of maximum permissible exposure. It will also coordinate the various radiation activities of the federal government. Public Health Service will be responsible for research on environ-

Washington Newsletter

(Continued)

mental radiation, but AEC will continue its present research licensing and regulatory functions.

The order is the result of a top-level executive study set up last March after mounting Congressional criticism that AEC, charged with promoting atomic development, was not suited for the conflicting role of public protector.

Legislation to require warning labels on hazardous household products has drawn the united endorsement of chemical and other industries—in principle.

But they were agreed that the bill now under consideration by the Senate Commerce Committee needs tightening to assure that labeling requirements are not applied needlessly to substances that present no real danger.

A number of technical flaws were pointed up in the bill introduced by Sen. Warren Magnuson (D., Wash.) and Sen. Prescott Bush (R., Conn.). This indicates that nothing will be done before the next session of Congress. The House has not even scheduled hearings.

Sen. Vance Hartke (D., Ind.), the only senator who attended hearings last week, advised industry and the Food & Drug Administration to get together and come up with legislation eliminating the bugs.

The proposed bill would require a "danger," "warning," or "caution" label, depending on the degree of danger, on all substances that are toxic, corrosive or irritant, a strong sensitizer, flammable, or which generate pressure (through decomposition or heat) that could lead to personal injury.

Emil Klarmann of Lehn & Fink Inc. (New York), chairman of the Chemical Specialties Manufacturers Assn.'s labeling committee, urged that the Health, Education & Welfare Dept. be authorized to clarify the regulations by issuing lists of products considered hazardous. The Manufacturing Chemists' Assn. endorsed Klarmann's suggestions.

Food, drugs and cosmetics are exempted from the proposed labeling requirements. The commission is working with industry to insert a separate title covering these products, but some industry members prefer that the Food, Drug and Cosmetic Act be amended instead.

FDA's George Lerrick also suggested strengthening the bill by providing injunctions to restrain violations of the act and stiffer penalties.

An order to stop discharging untreated wastes in the Missouri River has been issued to the city of St. Joseph, Mo., and 18 industrial plants. Among the plants are those of American Cyanamid's Lederle Laboratories and Anchor Serum Co. They have three years to establish treatment facilities.

Meanwhile, the Senate Commerce Committee has reduced from \$100 million to \$60 million the step-up in annual pollution-control grants approved by the House. The present level is \$50 million.

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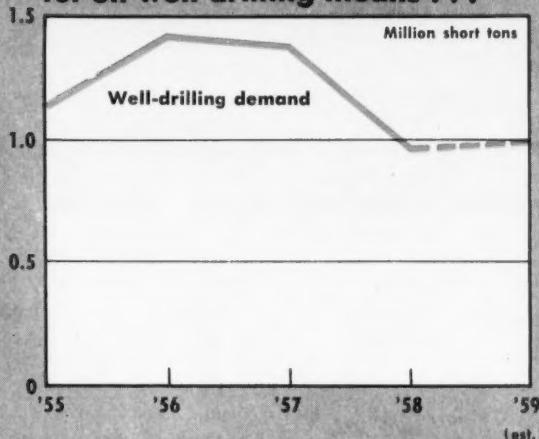
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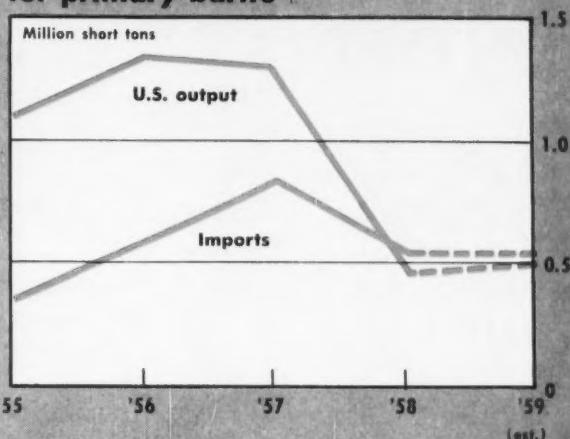
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M A R K E T S

Sharp drop in barite for oil well drilling means . . .



. . . Major slump in market for primary barite



Are Barium Chemicals Past Their Peak?

The U.S. barium chemicals business took a nose dive in '58. Output of primary barite slumped 63% lower than in '57, hit a 15-year low. Imports—an increasingly important part of the U.S. barium supply picture—also declined sharply, but slightly exceeded domestic output for the first time. With half of '59 over, few barium suppliers can see an immediate improvement.

Cause of the '58 barite production/sales slash was a broad cutback of demand for barite and other barium chemicals by virtually every major consuming industry. Demand for crude barite (both domestic and imported) tumbled 28% in '58, and sales of crushed and ground barite declined 30%. Moreover, sales and production of every type of refined barium chemical fell off considerably (see chart, p. 32).

This gloomy picture—as revealed in a just-released industry survey by the U.S. Bureau of Mines—casts considerable doubt on the likelihood that barium markets will reach 1.75-million tons/year by '60, a level predicted by trade sources a few years ago. Then, the barium industry was riding the crest of a boom that sent demand soaring 65% in '50-'55.

Main factor behind the current slump is lack of demand by the oil-well and gas-well drilling business, which uses barite in large quantities as an important component of drilling muds (*CW*, May 2, p. 33). Demand for ground and crushed barite for this purpose dropped to 977,255 tons in '58, about 415,000 tons less than in '57; this decline followed a smaller cutback to about 1.39 million tons in '57, from 1.42 million in '56.

Well-Drilling Drags: Well-drilling statistics for the past few years clearly spell out the barite market situation: after total well footage sunk by the oil and gas industry reached a peak of some 234.3 million ft. ('56), footage dropped to 219.4 million in '57 and 194.7 million in '58.

The outlook for '59 is for moderately increased drilling—some oil industry observers estimate from 200-210 million ft. But this does not mean that the barium industry is on the way to recoup its former big markets.

Reason: oil industry observers view the current slackened drilling rate as a "normal" plateau, say the peak '56 drilling was above normal (attributed to the Suez crisis). In fact, some experts predict that the U.S. oil indus-

try will never again drill 58,000 holes in one year (58,271 holes were drilled in '56).

This leveling-off of well-drilling would mean that this segment of barium markets also has probably hit a plateau, since drilling accounts for about 95% of total U.S. barite consumption.

The barium industry's complete recovery therefore depends on expansion of other markets, or the opening of new markets—or both.

Barium Beatniks: As a family, barium chemicals (table, p. 32) have taken a drubbing during the past two years. In '57, for example, production and sales of all compounds except barium oxide fell off. These declines continued in '58. Apparently, barium oxide, in '58, shared the waning fortunes of the other barium compounds. Specific data for barium oxide last year, withheld by USBM, was included in the "other barium chemicals" category to avoid revealing individual company data. But it's obvious that oxide demand was down: the total 13,871 tons of "other" chemicals sold in '58 was significantly less than the 14,159 tons of oxide reported sold in '57.

The fact that barium oxide demand

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U.S. barite end-uses decline

	(thousand short tons)		
	'56	'57	'58
Well drilling	1,421.0	1,392.4	977.2
Glass	32.6	27.6	9.9
Paint	20.6	16.2	14.6
Rubber	22.1	21.8	18.4
Miscellaneous	6.6	9.2	6.7

U.S. barium chemicals output slumps

	(thousand short tons)		
	'56	'57	'58
Black ash	131.0	112.0	93.5
Carbonate (synthetic)	82.0	74.2	56.7
Chloride (100%)	11.7	9.7	8.5
Hydroxide	16.9	12.7	9.9
Oxide	19.8	20.4	*
Sulfate (synthetic)	9.9	9.1	6.6
Other	1.8	1.2	18.5

* Reclassified: now included in "other" category.

increased in '57 while demand for other barium chemicals was declining is attributed primarily to a consumer switch to the oxide from barium hydroxide.

Main use of barium oxide is in manufacture of lube oil additives. Demand for lube oils suffered because of the '57-'58 recession; hence, barium oxide demand fell off in '58.

TV Tips Carbonate: The barium carbonate market is tied closely to the television industry—main use of barium carbonate is in manufacture of glass for television picture tubes.

But that market has been pretty well saturated now, and TV tubes are mainly manufactured for tube-replacement purposes.

Pyrotechnics Fizzle: Several barium chemicals—mainly the nitrate and, to some extent, barium peroxide and oxide—have suffered market declines because of cutbacks in manufacture of pyrotechnics and munitions. Distributors of these chemicals are hopeful that '59 sales will be at least slightly better than '58. There's no expectation of reaching peak markets of several years ago. These barium uses are relatively small; in fact, USBM lumps the nitrate and peroxide with "other" barium chemicals, sales of which, as a group, amounted

to 13,871 tons in '58 (mostly oxide).

Lithopone Limps: Lithopone* consumption data is no longer reported separately by USBM, but it's a sure bet that demand for this material has also declined in the past two years (it has been on a downgrade at least since '53), for two reasons: titanium dioxide has taken over much of lithopone's markets in paintmaking.

The reasons behind sales declines for barite and barium chemicals vary according to the specific problems faced by major consuming industries, although sales of all barium chemicals indirectly felt the sharp slap of the '57-'58 recession.

But while the recession sting has now abated, the flush of the previous levels of prosperity isn't coming back fast; the consistent pattern that emerges from probing of various areas of barium's consuming industries is this: '59 will be a better sales year than '58, and the sales/production downturn will probably be either curbed or significantly slowed in most cases. But there's no boom ahead—marketers of barium chemicals will likely face an uphill market pull for some time to come.

* Lithopone is a mixture of barium sulfate and zinc sulfide in varying proportions; about two-thirds of "standard" lithopone is barium sulfate.



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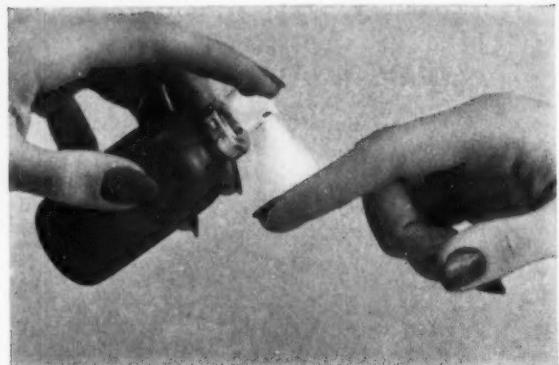
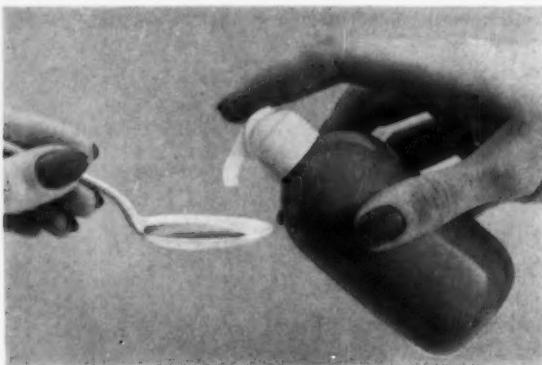
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Pairing Chemicals with Plane Production

Aircraft manufacturing is no longer an unlikely place to find commercial chemical development. More and more airframe makers, turning up chemical inventions in the course of their normal aeronautical, engineering and electronic research, are becoming chemical salesmen, exploiting inventions outside their regular spheres of activity.

Case in point — Navan Products, Inc., created by North American Aviation (Los Angeles). Right now, it's working up commercialization of a new coating that prevents scale formation on metals during heat treating. The product, still without a name tag, is only one of the several ventures now being handled by Navan, which was set up about two years ago to handle such inventions.

In recent months, Navan's chemical processing ventures have resulted in four other marketable items, including an aluminum alloy (Tens-50) of sodium and beryllium that prevents embrittlement in aluminum castings; and a hard-wax-type corrosion inhibiting coating (Sabrex) for stored parts that can be spray-applied and removed. Prior to its establishment of Navan, North American licensed a chemical milling process to Turco Products, Inc.

Others in the Business: Convair, a division of General Dynamics, relies on its patent department to market its inventions. It has come up with seven by-products of its engineering inventiveness. They range from electronic devices that determine whether material in pipelines or tanks is liquid or gaseous to meters that measure changes in fluid volumes. And only a few months ago, Convair launched Dynapak, a metal-forming machine tool.

Douglas Aircraft, too, has been active in commercial chemical development, pioneered development several years ago of nonflammable, high-temperature brake fluids. These are now produced and marketed under license by Monsanto.

When Need Is Recognized: Many companies make little or no effort to market "by-product" inventions because they lack the production or



Plane making is chemical research spur.

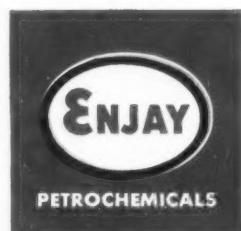


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SALES

sales organization to produce and sell such products at a profit. Marketing staffs of aviation firms, for example, are geared to sell planes, missiles and parts—not chemicals. Even when ideas are licensed out, they often fail to make money for the licensee because of inadequate promotion, low license fees.

Yet, aircraft companies scrutinize thousands of patents. In a recent study, for example, Navan found that of about 2,785 industry patent disclosures it investigated, only 406 had ever been marketed and only 47 were produced at a profit.

One reason for this poor showing, Navan feels, is that systematic approaches to selling by-product inventions have been few and far between.

Navan has a staff of about 30, and most of its top executives have extensive experience in consumer marketing. Emphasis falls on selling; Navan hopes to avoid entanglement with design and production.

Navan's patent promotion stretches well beyond ideas generated by North American; Navan fully intends to take its ideas where it finds them, pick up marketable inventions from "outside sources." The firm plans to capitalize on these in three ways: by direct sales, by licensing to outside firms and by a combination of direct sales and licensing.

To locate markets for its products, Navan stresses the sample selling method, charges for all samples. The company is convinced that a prospect is more likely to test a sample if he must pay for it. Moreover, the firm cannot afford market research for all potential products. Extensive use of direct mail is also made to prod interest in new items. As many as 3,000 people have been solicited in a single mailing.

That is essentially the technique Navan will employ to launch its anti-scale coating. The product has some unusual properties. Sprayed on a metal surface before heat treating, the coating pops off (spalls) after heating, leaves a scale-free surface. Ordinarily, heat treating produces an undesirable oxide coating that must be removed by pickling or sand blasting.

The company figures that the product will prove cheaper to use than inert-gas atmospheres that require special, costly equipment. Moreover,

the coating promises to be effective over a range of 700 to 3000 F.

Indicative of the aggressive promotion planned for its invention-marketing program is Navan's promotion of the coating although it isn't quite ready for commercial production. That's because testing hasn't been completed nor a marketable formulation decided upon.

Testing, says Navan, "has been successful in terms of the coating itself," but experiments now are to determine the effects of the coating on properties of the metal. Final version of the coating will probably shape up as a clay-based composition of solvent, acrylic binder and two "secret" materials. Navan will probably choose to license the product rather than sell direct.

Other Approaches: Navan's setup is somewhat uncommon in the aviation field; most aircraft firms still use their patent departments to market inventions. Douglas Aircraft, for example, uses its patent division for all licensing agreements whether Douglas is licensor or licensee. Its patent board passes on the merits of inventions submitted to it. A license salesman concentrates on contacting a small, but select group of firms—usually fewer than 200. The size of the group is small because most of Douglas's inventions are closely related to the aeronautical and missile industry.

Douglas reports a "seller's market" for patent licenses. Thousands of vendors, it tells *CW*, visit its plants to shop for licenses. Douglas gets 10-25 proposals for inventions each month; on the average, they result in the firm's filing of about 50 patent applications yearly.

Profit Payoff: What is the payoff from aggressive marketing of inventive creativity? Navan's experience offers this clue: although only two years old, the subsidiary expects to top the \$1.5-million sales mark this year. And that will exclude license income on about 20 inventions and sales of new products such as the antiscale coating.

Less tangible, but nonetheless real, says Navan, is the way it has speeded up commercial development. In the case of the chemical products, for example, the inventions get into the hands of users in months rather than years.



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HYDROZIM
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HYDROSULFITE BZ

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INDUSTRIAL CHEMICALS

Property Data	
Chemical Formula.....	CH ₃ Cl
Molecular Weight.....	50.491
Specific Gravity	
Liquid—23.7°C/4°.....	1.00
20°C/4°.....	.92
Gas 0°C, 1 atmos.....	1.74
Boiling Point °C, 760 mm.....	-23.76
°F, 760 mm.....	-10.76
Refractive Index, n 20°/D	
Liquid—23.7°C.....	1.3712
Gas 25°C.....	1.000703
Solubility (in cc.) of Methyl Chloride Gas in 100 cc. of solvent (20°C, 760 mm)	
Water.....	303
Benzene.....	4723
Carbon Tetrachloride.....	3756
Glacial Acetic Acid.....	3679
Ethanol.....	3740

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SALES

DATA DIGEST

- **Polyurethane Rubber:** Eight-page brochure gives properties and applications of Neothane castable polyurethane rubber. Chart compares properties of this material with those of natural and other synthetic rubbers. Goodyear Tire & Rubber Co. (Akron).

- **Industrial Gases:** Illustrated catalog describes production, properties, uses and availability of industrial and rare gases. Chart gives conversion data for oxygen, argon and nitrogen. Air Reduction Sales Co. (New York).

- **Acrolein:** Chemistry of acrolein is discussed in new 22-page booklet. Included: descriptions of over 40 basic reactions with equations, physical properties, recommendations for safe handling, and bibliography. Shell Chemical Corp. (New York).

- **Polyglycols:** New edition of bulletin lists properties, applications, handling precautions and descriptive facts about 40 polyglycols. Dow Chemical Co. (Midland, Mich.).

- **Fatty Acids:** Catalog presents basic facts on company's line of fatty acids. Specifications are given for stearic and oleic acids, tallow fatty acids and glycerides, glycerine, coconut and other vegetable fatty acids. Chart shows component fatty acids in each product. A. Gross & Co. (New York).

- **Containers and Packaging:** Bibliography of information sources on packaging and containers for all types of products. Small Business Administration (Washington, D.C.).

- **Acetophenone:** Twelve-page bulletin details the reactions, properties, specifications and applications of acetophenone. Union Carbide Chemicals Co. (New York).

- **Alkylolamides:** Methyl esters of fatty acids are described for use in formulating household detergents, cosmetics, shampoos and other surfactant applications. Emery Industries, Inc. (Cincinnati).

- **Synthetic Rubbers:** Sixteen-page brochure gives complete specifications on company's line of seven synthetic rubbers containing carbon black. Goodrich-Gulf Chemicals Inc. (Cleveland).

- **Isobutyl Alcohol:** Five-page booklet compares properties and applications of isobutanol with those of normal butyl alcohol. Eastman Chemical Products, Inc. (New York).

Available in New England

CHEMICAL SALES

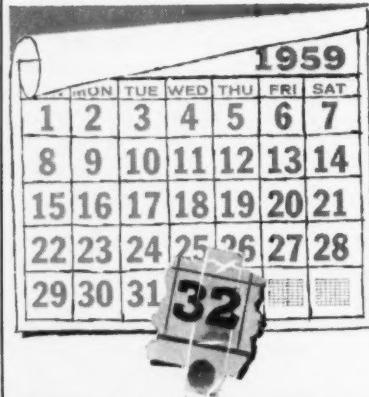
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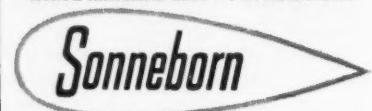
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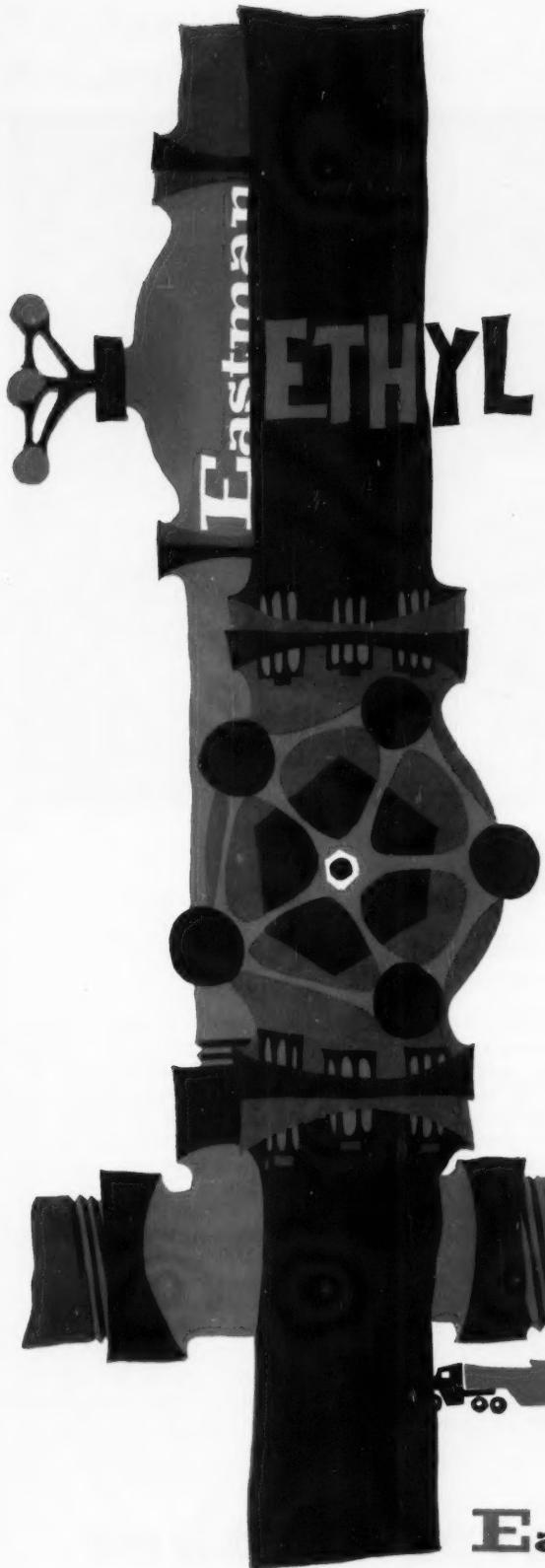
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Technology Newsletter

CHEMICAL WEEK
August 22, 1959

Amoco Chemicals will boost output of trimellitic anhydride. It will immediately start construction of a semicommercial plant to make "multimillion-pound quantities." Site: south of Joliet, Ill.

Trimellitic is made from pseudocumene by Amoco's liquid-phase air oxidation being put to work at Joliet to make phthalic anhydride, terephthalic and isophthalic acids. Amoco has been pushing trimellitic for many applications, but particularly for water-soluble alkyd surface coatings (*CW*, Aug. 8, p. 42).

Other news on the same processes:

- Amoco President Jay Forrester tells *CW* that the firm has shipped dimethyl terephthalate to Goodyear. Presumably, this means it has made terephthalic acid at Joliet.

The Fluor Corp. (Los Angeles) will be the prime contractor for the Interior Dept.'s second saline-water conversion plant—a nuclear heated flash-distillation unit.

Interior's supplemental appropriation request for the distillation unit is awaiting action by a conference committee of the Senate and House. The \$2-million plant will be built at a California site to be selected in early September. Construction is expected to start in the spring of '60, end about a year later.

Meanwhile, the Atomic Energy Commission has been authorized to spend up to \$4 million (more likely \$2-2.5 million) for an experimental low temperature process heat reactor to supply 40,000 thermal kw. for the distillation unit. Construction on the reactor is scheduled to begin April 1, '60, and finish about Jan. 1, '62.

Producing low-temperature process heat in atomic reactors will be subject of one-day symposium to be held by the Atomic Energy Commission Oct. 1. Purpose of the meeting (at AEC's Germantown, Md., headquarters) is to present information on process heat reactors and to gauge the extent of industry interest in participating in their development. It is anticipated that low-temperature heat reactors can be used in many manufacturing industries—including chemicals. Plants using such heat could be located far from sources of conventional fuels.

Callery's diborane process is clearer this week as a result of a recent U.S. patent (2,894,975). Although the Navy has decided not to open the plant (*see p. 21*), it still refuses to talk about the processing technique.

The patent describes a method of converting metal tetra-alkoxy borates to metal trialkyl borates. Here's how it probably fits into the scheme at Muskogee:

Technology Newsletter

(Continued)

Boric acid reacts with methanol to form borate. Sodium in oil is treated with hydrogen to form sodium hydride. This reacts with part of the methyl borate to form sodium trimethoxyborohydride, which in turn reduces the remainder of the methyl borate to diborane.

This reaction probably produces sodium tetramethoxyborate as a coproduct. And that's where the new patent is illuminating. It shows how treatment with carbon dioxide converts the tetramethoxy compound into an alcoholic solution of methyl borate. Coproduct of this reaction is sodium methyl carbonate (NaCH_3CO_3), which can be converted into sodium carbonate and methanol. Carbon dioxide for the carbonation is produced in the gas-generating section of Callery's plant there.

Commercial production of foamed aluminum within 90 days is the goal of Dynamic Metals Corp. (Houston), which is now readying a 6-million-lbs./year plant, first of its kind. Initial price of the foam, made by mixing zirconium hydride with molten aluminum, then extruding or molding the metal, will be 75¢-\$1/lb.

The firm plans to extend the capacity of its Houston plant ultimately to 20 million lbs./year and expects to spend about \$2 million to build 5 other plants at other sites. Its foaming process is licensed from Bjorksten Research Laboratories, Inc. (Madison, Wis.), recent recipient of a patent in the field (*CW Technology Newsletter*, July 4, '59). First uses of the foamed aluminum—which can be sawed, nailed or glued—are slated in construction, as roofing and building panels. Other uses (e.g., in aircraft) may follow.

A new cellulosic fiber that features high wet strength and can be used in a broad range of fabrics will soon be marketed in the U.S. through Hartford Fibres Co., a division of Bigelow-Sanford Carpet Co.

Called Zantrel, it will be made under license from Societe Chimiotex (Switzerland), which represents the fiber's other codevelopers, Compagnie Industrielle de Textiles Artificiels et Synthetiques (France), Fabela (Belgium) and Societe de Viscose (Switzerland). Experimental quantities have been imported from Europe, where it is registered (in France and Belgium) as a "polynosic fiber."

The first commercial quantities will be imported, too. But Hartford Fibres is building, at an investment of "several million dollars," a "several-million-pounds-capacity" plant in Rocky Hill, Conn., to be ready next summer. Initial cost of Zantrel will be 47-50¢/lb.

Electronic tubes using the semiconductor silicon carbide as an electron source are under development at Westinghouse research labs in Pittsburgh. A tiny crystal of the carbide serves to replace the hot, power-consuming cathode in the conventional tube. If perfected, the device will combine the inherent advantages of both vacuum tubes and semiconductors.

FROM A TO Z

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Acetone	Methylamine
Acetylene (dry)	Methyl Formate
Acrylic Acid (glacial)	Methyl Salicylate
Acrylonitrile (dry)	Mineral Oils
Acrylonitrile (wet)	Monoethanolamine
Alcohols	Naphtha
Aluminum Nitrate	Naphthalene
(no free nitric acid)	Naphthalol
Aluminum Sulfate	Naphthenic Acids (up to 180°F)
Ammonia (dry)	Nitric Acid (above 80%)
Ammonium Bicarbonate	Nitrocellulose
Ammonium Carbonate	Nitrogen
Ammonium Nitrate	Nitrogen Peroxide (dry)
(no free nitric acid)	Nitroglycerine
Ammonium Sulfate	Nitrous Acid
(no free sulfuric acid)	Nitrous Oxide (dry)
Ammonium Sulfide	Oleic Acid
Ammonium Thiocyanate (pure)	Organic Amines
Amyl Acetate	Oxalic Acid
Aniline (liquid)	Oxygen
Aniline (vapors)	Ozone (wet)
Animal Oils	Paints
Asphalt	Palmitic Acid
Barium Chloride	Paraldehyde
Benzaldehyde	Peanut Oil
Benzene	Phenol (up to 212°F)
Benzoic Acid	Phosphorus (dry)
Benzol	Phosphorus Pentoxide (dry)
Bituminous Compounds	Phthalic Acid (pure)
Boric Acid	Picric Acid
Butyl Acetate	Pinene
Butylaldehyde	Pine Oil
Butyric Acid	Plastics
Calcium Sulfide	Potassium Bromide
Carbolic Acid (phenol)	Potassium Chlorate
(below 212°F)	Potassium Chloride
Carbon Dioxide	Potassium Dichromate
Carbon Disulfide	Potassium Ferricyanide
Carbonic Acid (dilute)	Potassium Nitrate
Carbon Monoxide	Potassium Permanganate
Carbon Tetrachloride (dry)	Potassium Sulfate
Cellulose Acetate	Propionic Acid
Chlorine (dry)	Propylene Glycol
Chromyacetin	Pyridine
Chromic Nitrate	Resins
Citric Acid	Resorcinol
Creosote	Rubber
Cresol (below 212°F)	Salicylic Acid
Cyclohexane	Sewage
Diethyl Ether	Shellac
Dipentene	Sodium Acetate
Diphenyl Ether	Sodium Bicarbonate (dry)
Diestuffs	Sodium Borate
Ethers	Sodium Chlorate
Ethyl Chloride (dry)	Sodium Chloride
Ethylene	Sodium Chromate
Ethyleneglycol	Sodium Nitrate
Ethyl Oxalate	Sodium Oxalate
Fats	Sodium Sulfate
Fatty Acids	Sodium Sulfocyanide
Ferrous Ammonium Sulfate	Sodium Thiosulfate
Ferrous Sulfate	Steam, Low Pressure
Formaldehyde	Stearic Acid
Freon 11, 113	Streptomycin
Freon 12, 22, 112, 114	Succinic Acid
Furfural	Sulfur Dioxide (dry)
Gas, Illuminating	Sulfuric Acid (fuming)
Gases, Flue	Synthetic Rubbers
Gasoline (anhydrous)	Tannic Acid (pure)
Gelatin	Tars
Gluconic Acid	Tartaric Acid
Glucose	Tetramine
Glycerin (pure)	Toluene
Glyceryl Phosphate	Triacetin
Hydrocyanic Acid	Trichloroethylene (dry)
Hydrogen	Turpentine
Hydrogen Peroxide	Ultramarine
(30% and higher)	Urea
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Hydrogen Sulfide	Varnish Solvents
Isobutane	Water, Industrial
Kerosene	Water, Sea
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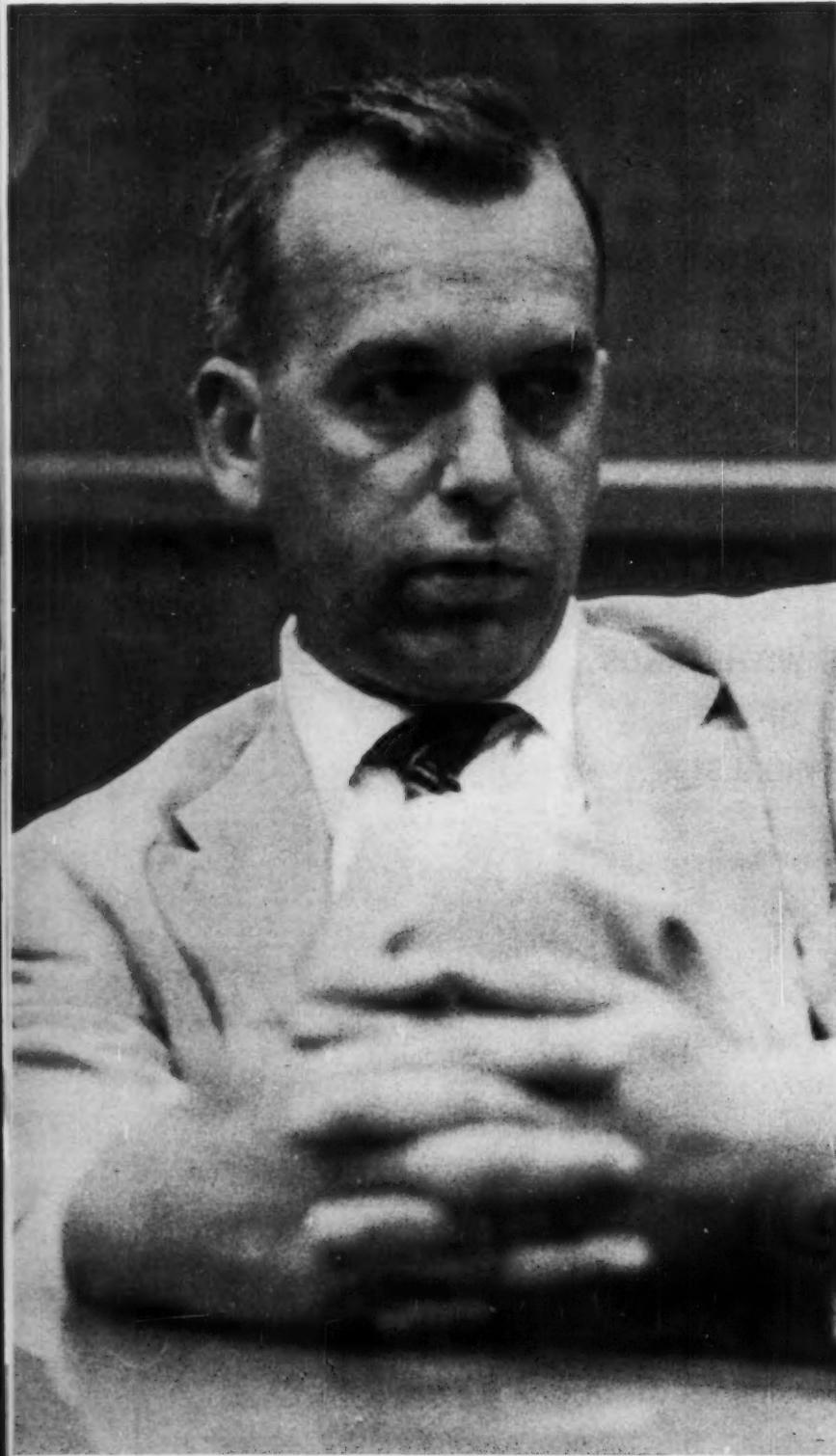
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ADMINISTRATION



Personal Products' Fred Henry weighs course leader's comments.

CW PHOTOS—LIONEL CRAWFORD

Plant Managers

Last Wednesday 20 management-level employees at Personal Products Corp., affiliate of Johnson & Johnson, gathered after work for the third session of a course in practical politics sponsored and conducted by the company. The company's program is part of a trend in which chemical process concerns are, at last, becoming active in an area of employee relations long considered "fair game" by a few companies and most labor groups.

The theory that corporations should be doing more to encourage management-level personnel to take an active part in state and local politics is not new to the CPI. But putting the theory into practice often is.

Personal Products, whose eight-week course is patterned after a program launched in January by the U.S. Chamber of Commerce through its local organizations, is one of the first CPI firms to implement the theory. The move isn't unexpected—parent J&J has had for eight years

Group discussion turns up aspects



Ponder Pitfalls of Practical Politics

a policy of encouraging employee interest in sound government.

New Brunswick First: The Greater New Brunswick (N.J.) Chamber of Commerce, according to Executive Vice-President George Adams, was the first local group to use the USCC program. Its initial efforts were in cooperation with the Eagleton Foundation—a privately endowed, social sciences research organization on the Rutgers University campus. Then it set up eight seminars to which key business and industrial leaders in the area were invited. Those attending included representatives of the local plants of Personal Products, Union Carbide Corp.'s Plastics Co., National Lead Co.'s Titanium Division and Hercules Powder Co.

Purpose of the chamber's program was to encourage participants to become "teachers," to take the information back to their businesses and plants. In addition to material supplied by the chamber, they received case studies supplied by the foundation.

The foundation further cooperated by dividing the program into a seminar schedule, suggesting a textbook (J. J. Weurthner's "Businessman's Guide to Practical Politics"). In addition, Donald Herzberg, foundation executive director, and Donald Riddle, director of secondary school projects, served as discussion leaders on their own time.

Personal Products' Approach: Personal Products' John McBride, training director, and Jack Kennedy, labor relations manager (*see picture*), attended the chamber's seminars, have planned, and are teaching, their company's course. They use the supplemental material suggested by the foundation, run the sessions in a discussion format.

Neither McBride nor Kennedy have had political experience, but both have developed a deep interest in politics since taking the chamber's course. They're convinced there's a need "to make people aware of the true situation so they can express

themselves intelligently in politics."

The approach McBride and Kennedy use is designed to first show the participants how little they know about political machinery and politics, then start providing just such knowledge.

For example, the first session was devoted to asking the "students" about their political experiences and interests. The point was to expose their political ignorance. While a few were familiar with politics, most readily realized the need to know more about the political scene.

Later sessions will cover such topics as the need for political parties, what they stand for and how they operate, municipal government, precinct politics, political clubs and meetings, the political leader's problems, and the businessman's role in politics. Participants will be given several assignments each that will put them in contact with politicians in their communities.

The emphasis, according to Mc-

of politics on which 'students' need most instruction.

PP's McBride leads course, was trained by USCC.



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ADMINISTRATION

Bride, is on encouraging employees to act as individuals in politics, and not necessarily reflect company points of view.

McBride plans to continue the course until all of the company's management personnel at its Milltown, N.J., headquarters have taken it. After that, he said, there are executives to be reached in the company's Chicago and Sunnyvale, Calif., plants.

J&J Influence: As a result of J&J's sound-government program, William Baumer, assistant to the president, says 200 members of the company's management now hold elective offices.

The company also actively supports employees' participation in politics by providing company time for discussions of political problems.

There's a J&J credo for political activity for business and industrial firms that spells out the firm's views. It recognizes "every employee's obligation as a citizen to be active in politics and government in the party of his choice." It also expresses the belief that there should be opportunities within the company for "full, free and nonpartisan political discussion, so that opinion may be intelligently developed."

Two Misconceptions: There are two major misconceptions that a company's practical politics program must overcome, Baumer says. One idea, held by some outsiders, is that the company is trying to influence employees in their choice of political parties or ideals, and another is the thinking by company officials that such a program will result in bad community relations.

To counter the first misconception, Baumer points out, a company must teach and preach that the individual is free to make his political choices—that although the company encourages his activity in politics it doesn't tell him how to think. "There's plenty of room in both parties for good businessmen," adds Baumer, who is a Republican councilman in Westfield, N.J.

On the second point, Baumer cites his own firm's experiences: "In Texas, we gained a great deal of prestige and favorable community reaction, because one of our men there was a popular officeholder. Experiences such as this should convince reluctant company officials that a company can

improve community relations by encouraging its people to become active in community affairs."

Other Firms Active: Hercules, National Lead, Carbide and Monsanto are planning to conduct courses similar to the Personal Products plan.

Recently, 334 employees at Koppers Co.'s Pittsburgh headquarters signed up for a local chamber of commerce course, and the company is encouraging its employees in other localities to attend similar sessions.

According to American Can Co. President William Stolk, his company is testing the chamber of commerce course in some of its plants. "The time has come to oppose powerful forces that are seriously undermining our political and economic system," Stolk asserts.

CPI firms are beginning to cooperate with national organizations promoting political awareness, including the U.S. Chamber of Commerce, the Effective City Organization and the Employees' Labor Relations Information Committee.

CPI Significance: To the CPI executive, this trend means that companies will have opportunities indirectly to inject business points of view into politics. As Baumer puts it, "We encourage the man to work for any party he chooses. We apply no pressure, but we, of course, hope he will be sympathetic to those things that will benefit business."

In addition, it gives management an opportunity to make a favorable impression on the community by showing concern for community affairs, indicating a willingness to devote company time for discussion of those affairs, and by encouraging its people to give of their administrative talents to help solve civic problems.

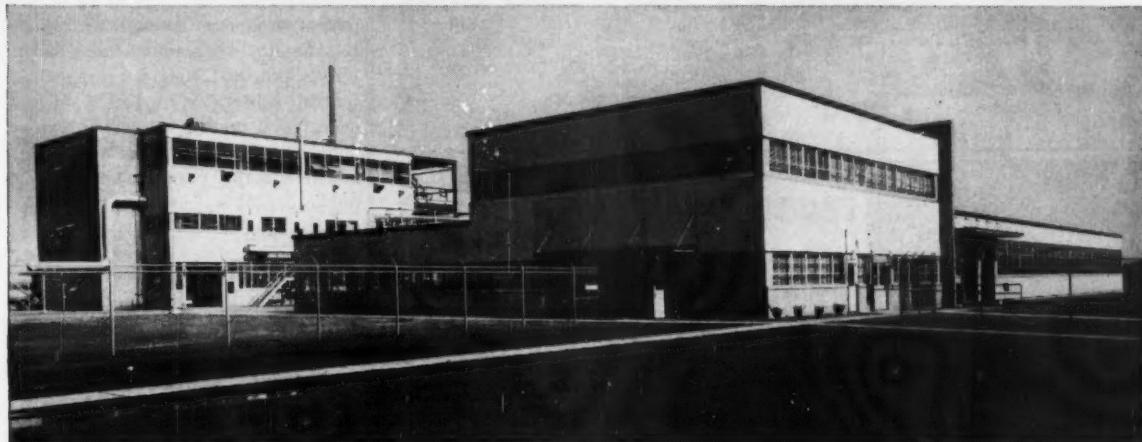
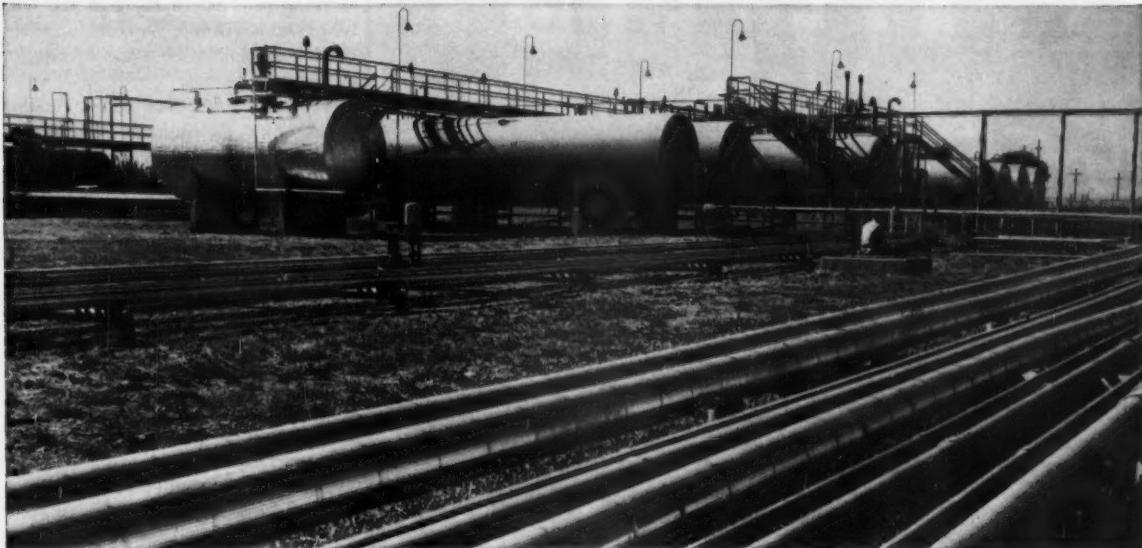
New Look for ICWU?

Local members of the International Chemical Workers Union this week are studying proposals to be placed before the union's convention scheduled for October in Cleveland. Current proposals are by the union's executive board, but others will be brought up on the floor by delegates.

Faced with mounting expenses and a holdover of reduced income from layoffs during the recent recession, union officers are advising that the monthly per-capita membership tax



Blaw-Knox builds complete Henry, Illinois, plant including all auxiliary facilities for B. F. Goodrich Chemical Company. Extensive tank farm includes raw material, finished product, and fuel storage. Main units shown below include process building (at left) office and warehouse units (at right).



B. F. Goodrich Chemical builds new \$5 million organic chemical plant

This new plant, built by Blaw-Knox, enables B. F. Goodrich Chemical to supply the oil, rubber, and plastics industries with a new series of antioxidants and other specialty chemicals.

In addition to the process areas on this complete-from-grass-roots project, Blaw-Knox's contribution included design, construction, and installation of the plant's auxiliary facilities. Utilities—including the water supply, waste disposal, and fire protection systems—were designed to handle about four times the plant's initial capacity. The tank farm with its extensive and complex piping system also was built to accommodate future increased output.

Throughout the entire project Blaw-Knox teamed closely with B. F. Goodrich to design a plant with a built-in future in meeting the increasing demand for rubber chemicals.

Contact Blaw-Knox Chemical Plants Division for a preliminary discussion on your next project. Headquarters in Pittsburgh; branch offices in New York; Haddon Heights, N.J.; Washington, D.C.; Birmingham; Chicago; and San Francisco.



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ADMINISTRATION

should be raised from \$1.50 to \$2. This move, incidentally, would bring ICWU's dues up to those of the Oil, Chemical & Atomic Workers, a difference once held to be a bar to merger of the two unions.

To curb costs, the board recommends that the union's conventions be held every other year rather than annually.

Significantly, no mention has been made of continuing merger negotiations between the two international unions. Arrangements were made a year ago to hold conventions of ICWU and OCAW simultaneously in Cleveland should merger plans reach fruition. These plans came to an impasse earlier this year over disagreement about apportionment of top-level responsibilities.

Other recommendations submitted by the board call for changes in constitutional language aimed at helping amalgamated locals and to aid in the formation of joint councils with single coordinating bargaining agents. A fourth proposal calls for support of federal legislation to "assist atomic energy and mining workers to extend and improve minimum wage and Social Security coverage, and to aid public education."

LABOR

Raiding Upset: A decision by the National Labor Relations Board may affect future no-raiding agreements between unions. NLRB, in making a decision to disallow a Los Angeles union's abandoning collective bargaining rights that it had won, criticized AFL-CIO's agreement on the grounds it restricted an employee's choice among labor unions.

The board said that, although the no-raiding agreement tended to lend harmony to union dealings and eliminate interunion disputes, it impinged upon the board's exclusive jurisdiction and restricted employee's free choice.

Phosphate Results: Now that members of Local 36, International Chemical Workers Union, have returned to work following a work-or-be-replaced ultimatum by Virginia-Carolina Chemical Corp., negotiations are again under way between company and union. All employees but 30—charged by V-C with contributing to violence in the prolonged

strike—have been rehired, are operating without a contract, but with a 10¢/hour wage increase.

Meanwhile, other companies in the Florida phosphate fields have reached agreement with unions. Contracts have been signed by American Cyanamid and Armour Agricultural Chemical Co., leaving V-C and the Bonnie plant of International Minerals & Chemical Corp. still to sign.

Cyanamid, at Brewster, signed a three-year contract with Local 34, ICWU, calling for wage increases of 8, 9 and 10¢/hour, depending on base rate of pay, plus shift differentials of 6-12¢/hour. The contract also provides for an across-the-board increase of 5¢/hour in June, 1960, and another of the same amount a year later.

Armour's new contract with ICWU Local 37 is for two years, grants hikes of 9¢ and 10¢/hour, plus an additional 5¢/hour at the end of the first year, and 7-14¢/hour shift differentials.

KEY CHANGES

Rogers C. B. Morton to director, Atlas Powder Co. (Wilmington, Del.).

Laurence G. Mayne to vice-president, Nease Chemical Co., Inc., (State College, Pa.).

Albertus Slingerland to general manager, Spencer Chemical Co. International, Inc., subsidiary of Spencer Chemical Co. (Kansas City, Mo.).

John J. Denbrock to assistant to the vice-president, plastics, General Tire & Rubber Co. (Akron).

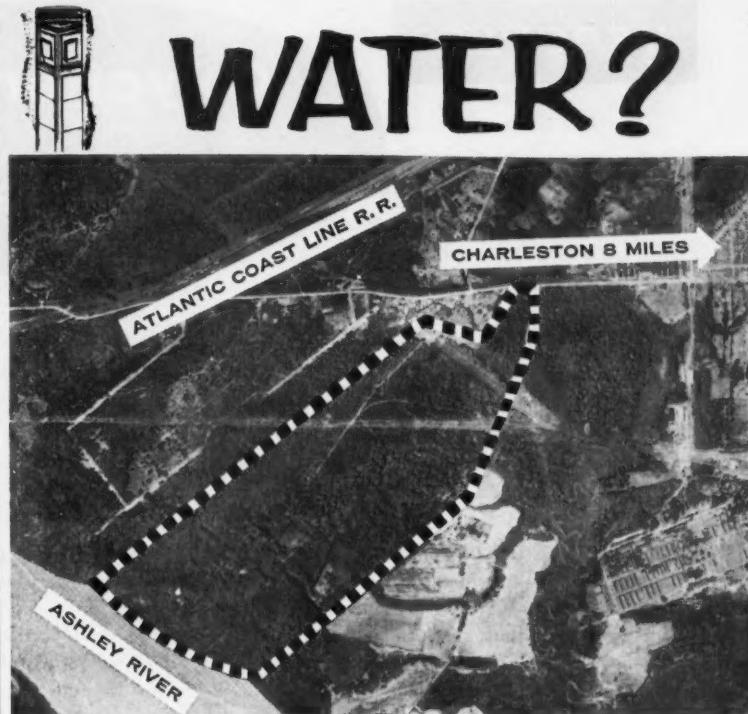
Robert O. Goodykoontz and J. Prince Warner to vice-presidents, Esso Standard Oil Co. (New York).

Paul W. Atwood to director, A. E. Staley Manufacturing Co. (Decatur, Ill.).

Clifton A. Wishart and Abram D. Reynolds to executive vice-presidents, Reynolds International Inc., subsidiary of Reynolds Metals Co. (Richmond, Va.).

Francis M. Barnes to assistant to the vice-president, administration, and assistant secretary, Crown Zellerbach Corp. (San Francisco).

Herschel Y. Hyde to director, Tide-water Oil Co. (Los Angeles).



YES! Here's a "site" of it for your chemical plant in the Southeast Coastal 6!

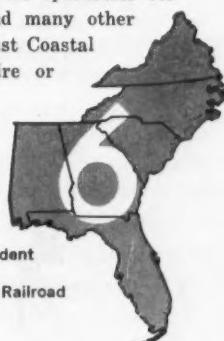
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Check Coast Line's industrial development specialists for details. The complete story on this and many other deep water sites in the growing Southeast Coastal 6 is yours for the asking. Write, wire or phone today. All inquiries held in confidence.

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HOSE-Z

Market Newsletter

CHEMICAL WEEK
August 22, 1959

Another maleic anhydride producer is on the way—as first mentioned by *CW (Market Newsletter, Aug. 8)*. Plans for construction of the West's first maleic anhydride plant were revealed this week by Fred Powell, president of California Chemical, a subsidiary of Standard Oil Co. of California.

The multimillion-dollar unit will have a capacity of 20 million lbs./year, "sufficient to fully serve requirements of . . . customers throughout the West, and those east of the Mississippi." The unit will go up by mid-'60 at Standard's refinery at Richmond, Calif. Feedstock for the new plant will be benzene—which the company produces in adequate quantities.

Marketing of Standard's maleic will be handled by Oronite, subsidiary of California Industrial Chemical. Part of the new plant's output will be processed into other chemicals sold by Oronite. Some will be used at the Perry, O., plant jointly run by California Spray Chemical (another Standard subsidiary) and Stauffer Chemical.

Standard's move into maleic production compounds the current problem of maleic overcapacity. American Cyanamid this week reports its maleic anhydride production will get under way at the firm's new unit at Bridgeville, Pa. Initial output will be 14 million lbs./year—to be increased to 20 million by '60.

Additional capacity is also planned or on the way by Reichhold, Heyden-Newport, and Pittsburgh Coke & Chemical.

Production, sales and earnings of plastics increased in '58, according to U.S. Tariff Commission preliminary figures. Total output of plastics and resins (except cellulosics) was up about 4% from '57, to 4,518 million lbs. in '58. Sales last year amounted to 4.06 million lbs., worth \$1.27 million, compared with 3.79 million lbs., worth \$1.23 million in '57.

Although produced in largest volume, vinyl and vinyl copolymer resins output was down slightly from '57, to 869 million lbs. in '58. Vinyl dollar volume increased to 829 million lbs., worth \$266 million, from 797 million lbs., worth \$267 million, in '57.

Polyethylene ran vinyls a close second in output, topped them in dollar values. The score: production, 865 million lbs.; sales, 854 million lbs., valued at \$270 million.

Styrene resins came in third with an output of 763 million lbs.—substantially more than the 680 million produced in '57. Production tallies for other plastics and resins in '58 (million pounds): phenolic and other tar acid resins, 488; urea and melamine, 349; alkyds, 502; polyesters, 117; epoxy resins, 41; cellulosics, 141; silicone, 3; phthalic alkyd resins, 416.

Market Newsletter

(Continued)

Reichhold Chemicals has opened its seventh formaldehyde unit in the U.S. Capacity of the \$500,000 installation at Kansas City, Mo., is rated at 30 million lbs./year.

Rapidly growing demand for germanium and selenium to be used in electronics is indicated by a new industry forecast of transistor markets; the outlook supports earlier expectations of a bright future for these chemico-electronic materials (*CW, July 27, '57, p. 34*).

Vice-President William Pietenpol of Sylvania's Semiconductor Division predicts that transistor sales will jump almost fivefold in the next half-decade to some 409 million units, worth \$396 million. An estimated 91 million units, worth \$231 million, will be made in '59—that already represents a big increase over the 1.3 million units, valued at \$5 million, sold five years ago.

To meet the anticipated fast increase of transistor use, Sylvania is now equipping a newly purchased plant at Manchester, N.H. A work force of nearly 1,000 is scheduled to start turning out the electronic units by early '60.

Production of molybdenum, tungsten and other refractory metals is also undergoing expansion at Sylvania Electric Products' Towanda, Pa., works. Production of 275-lb. ingots (only 100-lb. ingots have been available heretofore) is already under way, and bigger ones will come from a 16-ton isotactic press recently installed.

Demand for these metals is increasing because of greater needs by several important consuming industries, e.g., rockets, jet engines, industrial furnaces, electronics.

Price of isobutyl alcohol has been cut 1¢/lb., to 13¢/lb. in tanks, by Eastman Chemical. Reason for the reduction: "to broaden markets" and re-establish a 2¢/lb. differential between prices of isobutyl and n-butyl alcohols.

Union Carbide—only other producer of isobutyl—hasn't followed suit yet, but will likely do so soon.

SELECTED PRICE CHANGES—WEEK ENDING AUGUST 17, 1959

	Change	New Price
DOWN		
Coconut oil acids, dist., tanks	\$0.02 \$0.26
Mercury metal, 76 lbs./flask	3.00 231.00
Oleic acid, dbl-dist., dms.	0.005 0.18

All prices per pound unless quantity is quoted.

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PRODUCTION



Plant Management Problems You

Plant procedures seldom cover eventualities like those shown above. Yet all of these scenes represent true-to-life problems that confront management in virtually all the chemical process industries.

For example, the traditions of the Tennessee hill country caught DuPont's Chattanooga nylon plant in a Hamilton County police raid early this year. The raiders closed down what they described as one of the best constructed "moonshine" stills they had seen. The 30-gal. capacity unit had been operating on plant property in densely thicketed, swampy land only 250 yds. from the plant, less than 100 yds. from a softball field.

And Celanese's Belvidere, N.J., plant is policed by the New Jersey

state department of conservation, which traps and removes about 75 deer from the 800-acre grounds each year.

Plant management recognized the deer problem when the plant was obtained from Hercules 12 years ago. Protected by a 7-ft.-high fence around the wooded property, the plant's deer population multiplied. Unauthorized hunting and deer roaming the plant area were the posers. Employees attempted to drive the deer out, only succeeded in sustaining a few minor injuries.

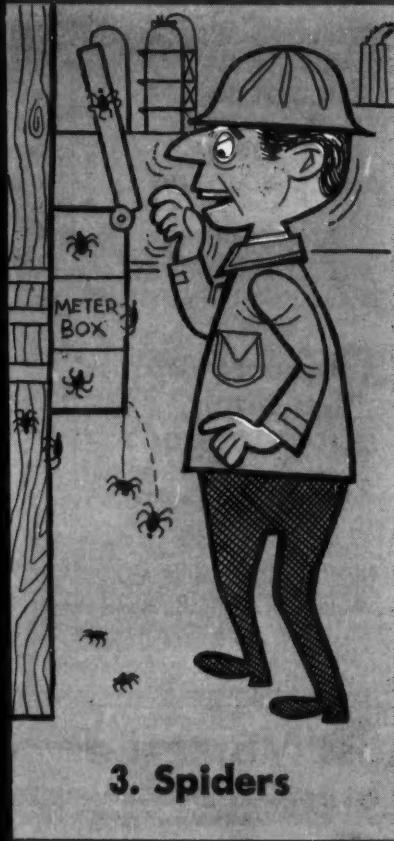
The company made an agreement with the conservation department, declared the area a game preserve and deer are removed only when they become too numerous. Employees now confine activities to offering food

scraps to deer that approach plant buildings.

Nature Stories: Freeport Sulphur's Garden Island Bay sulfur mine near the mouth of the Mississippi has been plagued by nutria, 20-lb. dun-colored animals. These furry creatures use their 3-in. incisors to chop up vegetation needed to prevent erosion of the banks of the mine's fresh-water reservoir. On one occasion they invaded machine shops and housing units.

The nutria caused more reservoir trouble in an upriver foray at Freeport's new Port Nickel nickel-cobalt refinery. They burrowed into the reservoir banks to build nests, caused many cave-ins before being ejected.

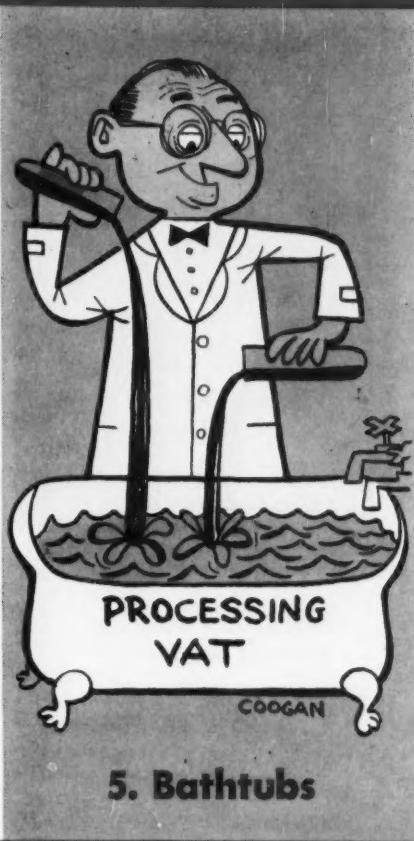
Eagles were blamed for circuit-breaker problems during startup of a



3. Spiders



4. Wasps



5. Bathtubs

Won't Find in the Operating Manual

West Coast plant. The theory: the eagles roosted on power cable insulators over Mount Whitney, drooped wings and tailfeathers against the nearest wire to complete a circuit. Trouble-shooting crews couldn't find any dead birds. But when sharply pointed cones were mounted on top of the insulators there were no more troubles.

Black widow spiders sometimes show up, usually about this time of year, at Esso's Bayway refinery. Although no employees have been bitten, they are warned to wear gloves around lumber piles, to spray dark corners of meter boxes—a favorite lair—before reaching inside. Esso follows National Safety Council instructions for coping with them.

Safety personnel at Dow's Texas

Division constantly check fire extinguisher horns and hoses for mud wasps, which regard the fire equipment as choice homesites.

Production Plus: All insects and animals don't cause trouble. Moa Bay, Freeport's Cuban subsidiary, acquired 200 beehives along with its nickel and cobalt mining land. No one wanted to buy the hives, so they were moved to an experimental farm. They now produce honey—under the care of a beekeeper—for the company's dining tables.

And at Valdosta, Ga., a flock of 25 sheep acts as fire wardens for the Langdale Co.'s rosin yard. The sheep crop the grass in the yard to sand level, have gone about the duty with such gusto that the flock has had to be reduced from its original number

of 40. The animals are sheared by local 4-H club members, but the wool quality is poor because of contamination by creosote and rosin.

Making Do: Oddities aren't necessarily problems. Bathtubs, for example, helped out a small West Coast chemical company that couldn't afford expensive processing equipment for making a crystalline galvanizing flux. A sympathetic local newspaper published an appeal to townspeople remodeling their homes and the company received about 150 old leg-style tubs.

Today the company is buying modern equipment, soon will retire the tubs.

But bathtub chemistry isn't peculiar to small companies. Dow developed a potassium iodide process for its

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PRODUCTION

Seal Beach, Calif., plant that uses an old-fashioned cast-iron bathtub complete with claws and rubber stoppers as the main reaction vessel (*CW*, Dec. 5, '53, p. 77).

New-fangled process equipment can even cause some out-of-the-ordinary problems. When one of the first bubble-cap fractionating towers was installed at an Oklahoma plant, one of the employees wanted to see what the inside of the column looked like. He stuck his head through an 8-in. nozzle—and got caught, face down, by his nose. A long pipe, padded at the end, was put through another nozzle, used to push his nose back up into the nozzle so he could pull his head out.

And, in supplying its Garden Island Bay sulfur mine with a pickup truck and a jeep, Freeport got into trouble. Two plank roads stretched out into the swamp for about six miles to the mine. The two vehicles collided at the intersection of the roads.

Plant managers don't put such problems into the all-in-a-day's-work category. But all agree that when similar puzzles do crop up, solutions can seldom be based on textbook training or past experience.

EQUIPMENT

Dry Pipe Dope: Chemtrol (10872 Stanford Ave., Lynwood, Calif.) is out with ½-in. Teflon tape, called Dri-Seal No. 5, that can be used instead of lead and oil combinations to dope pipe threads.

Gas-Expanding Turbine: Dean Hill Pump Co. (4000 E. 16th St., Indianapolis 7) is offering a small gas-expanding turbine, Type GET, that is fully reversible. The 1- to 45-hp. turbine can also be supplied with a single row of blades for nonreversible operation.

Compressor: For heavy-duty processing applications, Clark Bros. Co. (Olean, N.Y.) offers its new Model CJA Balanced/Opposed compressor. The unit is available with two, four and six cylinders with 11-in. stroke in 400- to 1,750-bhp. sizes and 450-rpm. rated speed. Equipped with different types of compressor cylinders, the compressor is suitable for process applications requiring vacuum or operating pressures to 35,000 psi.



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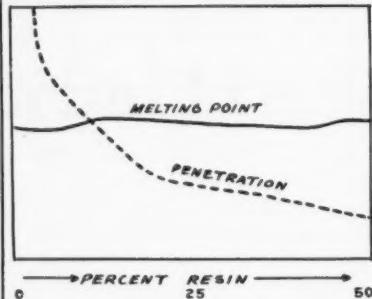


Chart shows unaltered melting point up to 40% resin content during a drop in penetration from 10 down to 1.

Shanco 300 will decrease the penetration of softer waxes without materially altering their other characteristics, as melting point and viscosity, this property provides a handy formulating tool in the compounding of hot dip coating, potting and impregnating compounds.

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Neither time nor the newer chemicals have dimmed Sodium Tripolyphosphate's attraction for chemical processors. This chemical Jack-of-all-trades improves the efficiency of processing in a wide range of totally unrelated fields. Glance over Tripoly's 5 outstanding properties and their applications...with a view toward employing them to advantage in your own processing.

1. Peptizer-dispersant

Sodium Tripolyphosphate deflocculates and forms highly stable suspensions of finely divided insoluble substances.

If in your process you work with gummy or viscous materials, Tripoly should be considered for peptizing these sticky elements to prevent adherence or deposition on materials and equipment.

Here is how a few industries elsewhere take advantage of Tripoly's PEPTIZING action:

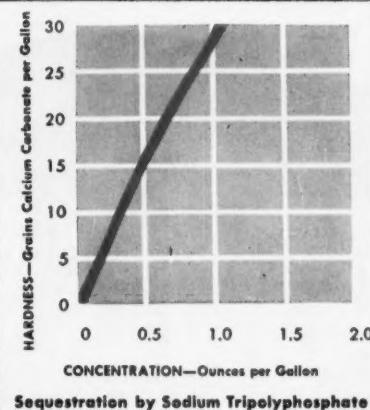
IN THE PAPER INDUSTRY . . . as little as 0.1% added makes near solid clay-coating slurries easily pumpable.

Having once discovered Tripoly, the paper industry now uses it in the felt bleaching operation, in washing, iron removal and in varied operations throughout the processing cycle.

IN TEXTILES . . . Tripoly's peptizing action disperses dyes more evenly through the fabric. It also disperses sizes, fillers and delustrants. As in paper processing, the textile industry also has extended Tripoly's use throughout the range of its own processing operations, taking full advantage of Tripoly's 4 other unique and versatile properties.

IN OIL DRILLING . . . Tripoly's dispersive properties substantially lower the viscosity of the drilling muds for easier, more economical pumping.

IN PORTLAND CEMENT . . . Tripoly's effective dispersal of the components in wet process cement can improve product quality, and by lowering the amount of



Sequestration by Sodium Tripolyphosphate

water for subsequent removal can effectively reduce kiln fuel costs.

IN LAUNDERING . . . Universally employed in laundry formulations, Tripoly produces a whiter wash by dispersing soils and also aids in preventing soil redeposition on washed articles as well as on equipment.

2. Low-cost sequestrant

Sodium Tripolyphosphate is outstanding in its ability to control hard water in any industrial operation. It combines with the calcium and magnesium hardness elements to form soluble complexes. They are non-reactive and won't form insoluble precipitates with other components to form scum.

Tripoly also redissolves precipitates already formed and which otherwise would adhere to materials and equipment.

It forms uncolored complexes with soluble ferrous salts. No ferric salts develop to stain fabrics, paper, laundered items, etc. Bleaching operations are minimized. The result is lower costs and brighter, whiter and stronger materials. These sequestering advantages are available for any operation involving hard water processing. Tripoly crosses all industry lines.

3. As an inhibitor a little Tripoly goes a long way

Far smaller amounts of Tripoly are required to inhibit precipitation than are needed to sequester the hardness elements. A few ppm will prevent scale formation in water systems, heat exchangers, and pipe lines containing several hundred ppm of hardness elements.

4. Outstanding synergist—builder

When Tripoly is used as a builder with a synthetic or soap-based detergent the resultant detergency is greater than the combined effect of Tripoly and the synthetic or soap acting independently. Tripoly is stable in heated solutions in the presence of alkalies. These advantages plus its low cost sequestering value make Tripoly an ideal builder for any detergent system.

5. A detergent in its own right

Tripoly's all round efficiency as a peptizer-synergist and builder makes it an applicable detergent by itself. It also enhances any wetting agent and can be added to anionics, for example, to produce a heavy duty cleaner. Effective sanitizing agents combine Tripoly with quaternaries. Tripoly with non-ionics form the base for controlled suds detergents.

DETERGENT APPLICATIONS OF TRIPOLY

include light and heavy duty household synthetics • hand and mechanical dish-washing compounds • automatic washer detergents (controlled suds) • abrasive cleaners • bubble baths • rug and upholstery cleaners • paint and wall cleaners • metal cleaners • laundry detergents • floor cleaners • steam cleaners • alkaline dairy cleaners (heavy duty) • neutral dairy cleaners

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- Disodium Phosphate, Crystalline
- Monosodium Phosphate, Anhydrous
- Monosodium Phosphate, Monohydrate
- Sodium Acid Pyrophosphate
- Sodium Silicate
- Sodium Fluoride
- Aluminum Fluoride
- Hydrofluoric Acid
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- Texco 120
- Texco Compound 3
- C-33 Sequestering Agent

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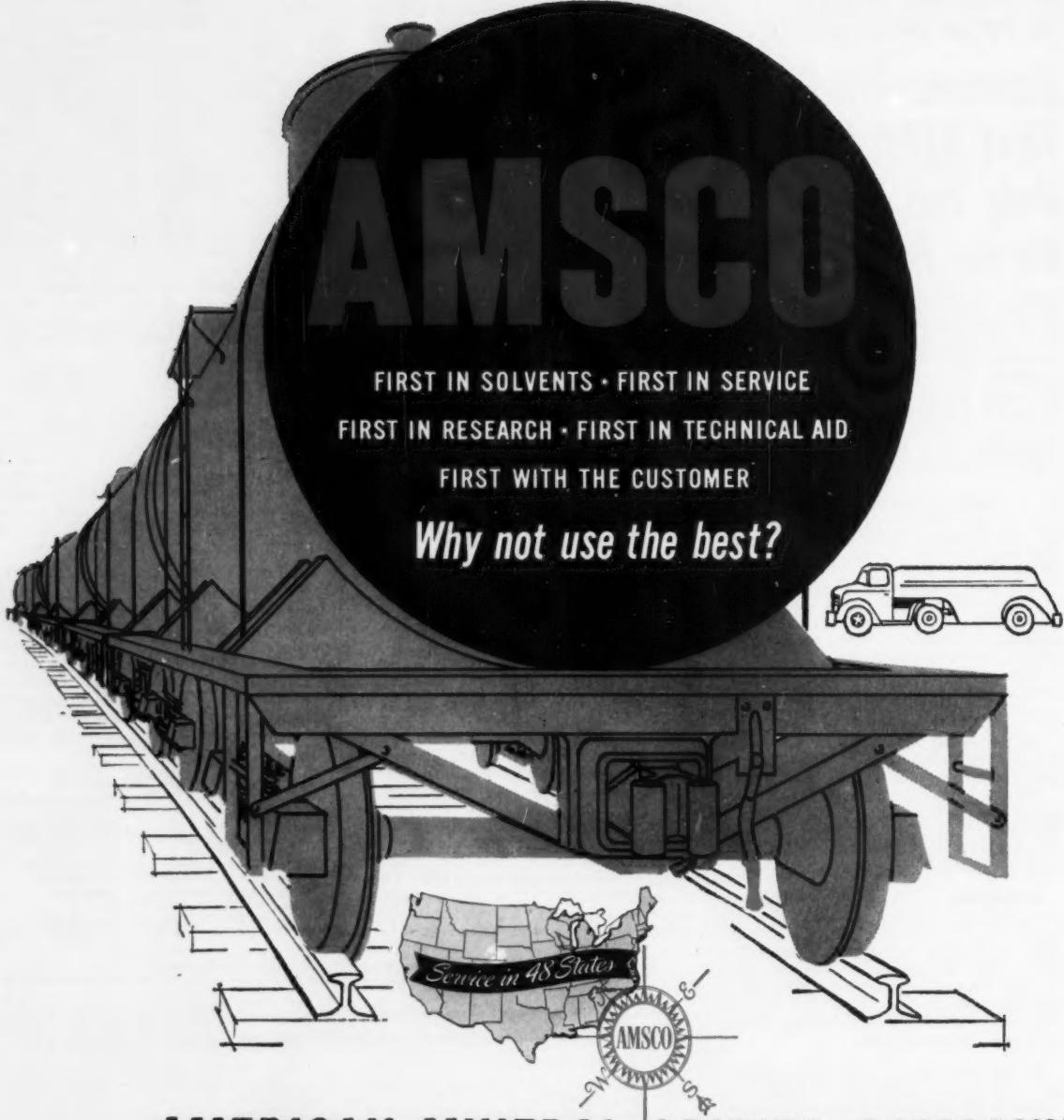
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ENGINEERING

Tower Taps Argon Bonus

Spencer Chemical Co. entered the argon business last week with the startup of a new recovery unit (right) at its Vicksburg, Miss., ammonia plant. The argon-producing system—first of its kind—was designed and built by American Messer Corp. (New York), recovers up to 100,000 cu.ft./day from ammonia processing wastes.

Behind Spencer's move into the inert-gas business lies many months of planning. Anyone with an air-separation plant knows that he has an argon source (0.93% of incoming air), but two problems confront him: how to extract it without hampering the production of other products and how to market it profitably. Here's Spencer's solution:

- Source of the argon is a scrubber bottom-fraction that's normally discarded. No addition to the labor force is needed.

- Marketing is being handled by a specialist in industrial gases: Southern Oxygen Co. (Bladensburg, Md.).

Key to the process: leaving the argon in the various gas streams until the point where its concentration is high and recovery problems are low. Removing it early, in the air-separation plant, would result either in losing most of the argon or in upsetting the balance of nitrogen and oxygen produced for the main purpose of the plant, making ammonia.

Two Years Coming: Spencer looked into the feasibility of producing argon at the Vicksburg facility as early as the spring of '57. Satisfied that the operation could be carried out with good yields and without interfering with ammonia production, the company signed an exclusive agreement with Southern Oxygen in the spring of '58 for marketing the product.

Engineering planning began in Aug. '58, and construction got under way in Jan. '59. Last week's startup lasted several days, involved careful dovetailing with ammonia production.

By selling its entire output through an established compressed-gas marketer, Spencer avoids usual problems of selling an item unrelated to other company products. And Southern Oxygen has been able to add to the supply of argon now coming from

its Bladensburg and Kingsport, Tenn., plants—with no capital outlay.

Richer Stream: In a relatively small air-separation plant, such as those designed for ammonia plants, more argon goes off with the oxygen than could be recovered in a sidestream from the low-pressure column of the air-separation unit. Reason: boosting argon recovery through the sidestream to greater than about 10% of the total amount in the incoming air would lead to a less-than-optimum balance of nitrogen and oxygen.

On the other hand, big air-separation plants for commercial production of argon—e.g., those operated by Air Products, Air Reduction, Linde, National Cylinder Gas—can recover 70-90% of the incoming argon, but only through the flexibility offered by the large-scale plant and under a less-stringent ratio of nitrogen to oxygen.

Thus, in an ammonia plant, it's better to leave the argon in the air-unit oxygen stream (95% oxygen, 4% argon), recover it later.

This oxygen stream is used by Spencer to oxidize natural gas for producing hydrogen for ammonia synthesis. After the oxidation step, the argon accompanies the hydrogen into a unit where the hydrogen is scrubbed free of impurities—including argon—by liquid nitrogen. The bottoms from this scrubber contain the argon; and it is from this stream, normally discarded, that Spencer recovers its argon. Approximate composition at this point: 14% argon, 33% nitrogen, 39% carbon monoxide, 10% methane, 3% hydrogen, less than 1% oxygen and krypton.

Routine Purification: Since it costs nothing to concentrate argon in the nitrogen scrubber bottoms, all that's required in the production of high-purity (99.995%) argon from this source is the routine removal of the other waste products.

Scrubber bottoms are first cooled to about -300 F, then fed to a column that eliminates krypton and most of the methane in a bottom fraction, while nitrogen and most of the carbon monoxide pass off overhead. The argon-rich fraction is then



Engineers compare notes on new argon recovery system.

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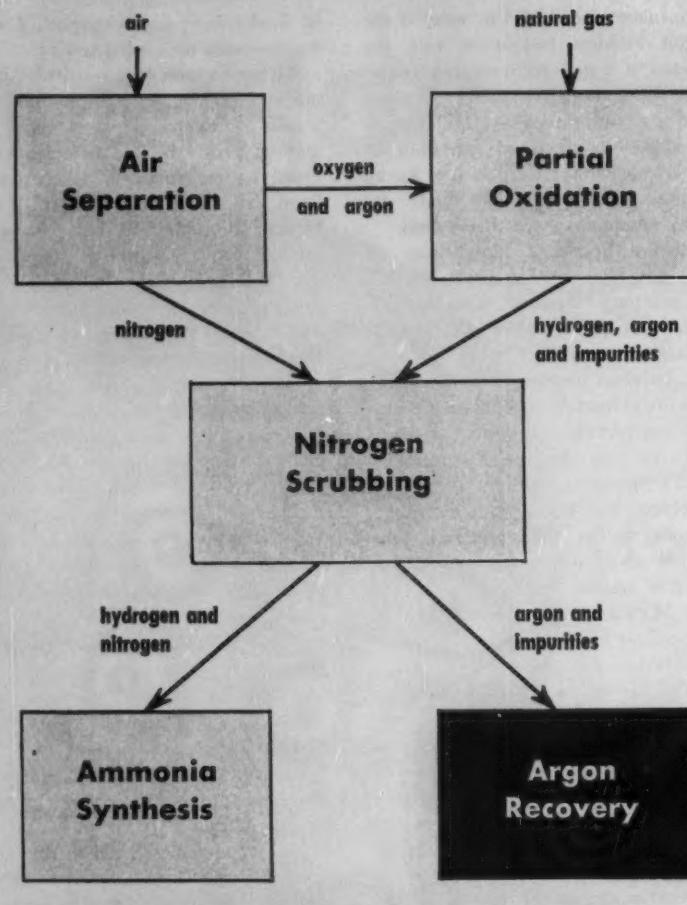
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Getting Argon from Ammonia Plant



heated to eliminate remaining carbon monoxide and methane, which burn with the oxygen remaining in the product to form carbon dioxide and water. After a scrubbing operation removes the carbon dioxide, hydrogen is added and the gas is reheated to complete the elimination of oxygen by causing it to burn completely to water. Low-temperature separation of the water leaves pure argon.

Alternate Route: Though Spencer's plant is the first to make argon in this way, Messer has built two similar units for hydrogen and nitrogen recovery in ammonia plants using natural gas reforming processes. Feed material for these installations—both in Europe—consists of letdown vapors containing 50-60% hydrogen and about 20% nitrogen. Argon is also present in quantities ranging from 3

to 7%, but neither of these units is designed to recover it.

Another potential advantage of this letdown vapor recovery route is the possibility of recovering any helium that may be present in the natural gas. The method used at Spencer's plant doesn't allow helium recovery because it passes off overhead in the nitrogen scrubber.

Patents Pending: Spencer and Messer both have applied for patents on various phases of the argon recovery process. Whether other ammonia makers decide to enter the argon business will undoubtedly be influenced by the outcome of these patent applications as well as by the same economic questions that confronted Spencer. Meanwhile, much of this potentially valuable product may continue to be lost.

Aluminum Opportunity

A new method of utilizing low-grade aluminum ore is now under development by the U.S. Bureau of Mines at Albany, Ore. Possible commercial products that could be derived from the material: alumina, low-phosphorus iron, titanium dioxide.

If the process proves successful—economically as well as technically—the bureau believes that aluminum plants in the Pacific Northwest could use this laterite ore, found in the vicinity of Salem, Ore. Present bauxite supplies for these plants come from the south central U.S. or from Japan.

One company, Harvey Aluminum (Torrance, Calif.), has already voiced interest in the route, but says that iron recovery would probably be necessary to the economics of the process. Composition of the Oregon ore: 30-35% alumina, 26-34% iron oxide, remainder mostly titania and silica. Phosphorus content is only 0.6%.

Double Leach: After calcination of the ore at 1050 C, it's leached twice with caustic, treated each time with lime.

In the first step—silica-leaching—60-70% of the silica is removed with 10% caustic at 90 C. The solution is treated with lime at 100 C to precipitate calcium silicate, regenerate caustic for reuse. Ratio used: 1-1½ lb. lime/1 lb. of silica. Most of the phosphorus is also removed during this step.

The second step—alumina-leaching—is carried out with 30% caustic in an autoclave at 210 C, 265 psi. Lime is again added (1¼ lb./lb. of silica) to precipitate additional silica. The remaining alumina-rich solution, says USBM, can then be treated by conventional methods to crystallize the alumina. Alumina yield is reported to be 82-87% from an ore that contains 16% silica.

Extra Dividend: Residue from the alumina leach is rich in iron oxide and titania, points to a possible dividend for the process. Typical analysis of this residue: 58% ferric oxide, 24% titanium dioxide, 6-8% alumina, 6-8% silica, less than 0.03% phosphorus. USBM estimates that 4 tons of ore could be processed to yield 2,000 lbs. of alumina, 1,200 lbs. of iron, 450 lbs. of titanium dioxide.



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RESEARCH



CW PHOTO—ED GILCHRIST

Stokes Corp.'s Gilbert sees a big future for vacuum-coating cadmium and aluminum on steel.

Putting More Sell in Low-Pressure 'Plating'

This fall, F. J. Stokes Corp. (Philadelphia) will ship its first two production units for continuously vacuum-coating aluminum on paper. Meanwhile, the firm has sold its first batch units for depositing heavy coats of cadmium and other metals on steel to Standard Pressed Steel Co. (Jenkintown, Pa.) and The Martin Co. (Baltimore). These pioneering sales, Stokes believes, promise a new industrial payoff for vacuum-coating research.

Vacuum coating, the deposition of evaporated metal onto a surface under vacuum, has a commercial history starting about 1935, with optical coating (e.g., reflection control on lenses). It's currently used to coat glass, plastic toys, decorative materials. But its future may now include large-volume industrial uses,

thanks to research that is overcoming the method's present handicaps.

Centers of this research are Stokes, National Research Corp. (Cambridge, Mass.), and Consolidated Electrodynamics Corp.'s Rochester Division (Rochester, N.Y.). Their common objective: to improve the vacuum-coating equipment so that it can handle a greater variety of industrial jobs.

One hurdle, until now: finding a sufficiently durable crucible for holding molten aluminum over the long (12 hours or more) periods of time required for practical continuous operation.

Both Stokes and NRC claim to have licked this problem, but aren't disclosing details. It is known, however, that typical coaters are fed aluminum wire, which melts and vaporizes in a resistance-heated car-

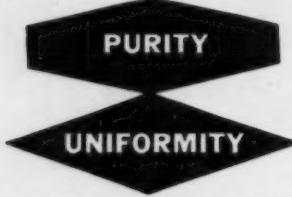
bon "boat." Untreated carbon erodes quickly. But addition of zirconium or hafnium to either the boat or the wire extends the life of the boat. And other materials, unrevealed, also impart erosion resistance.

This achievement is important both in continuous ("air-to-air") coating of paper and other materials and in batch-coating steel with heavy layers of cadmium or aluminum for corrosion resistance.

On Paper: Aluminum-coated paper is already finding commercial acceptance in packaging, manufacturing electrical condensers and the like, and is expected to be in wide use within two years.

Vaculite Corp. (Hamilton, O.), jointly owned by NRC and Champion Paper is already producing some with NRC-developed equipment. How-

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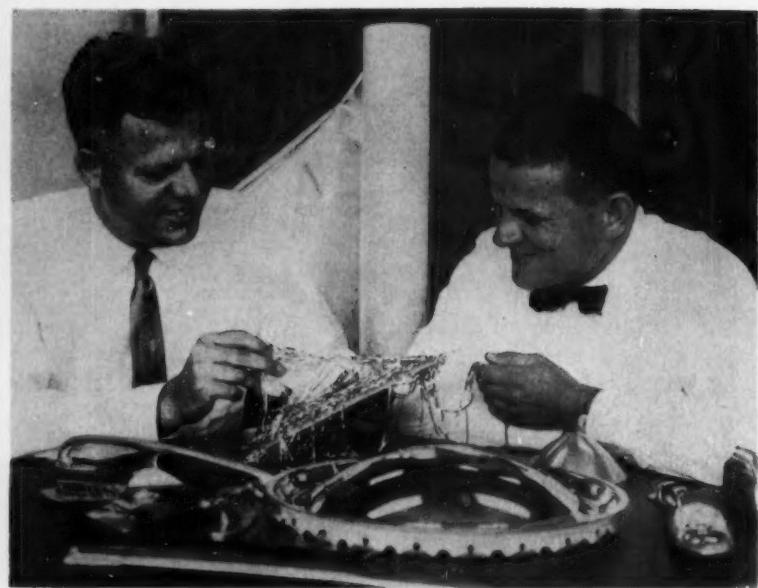
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RESEARCH



NRC's Stauffer and Clough show aluminized plastic 'icicles.'

ever, the Vaculite equipment is not used for runs as long as 12 hours.

There are a variety of reasons for producing aluminized paper. It can be made with about the same reflectivity as laminated aluminum foil at 60% of the latter's cost. And it preserves the properties of the paper. Normally, the coating is only two to three millionths of an inch. A coating that's much thicker than that isn't considered economical.

Fast Coating: NRC's vice-president and director of research, Robert Stauffer, and Philip Clough, director of metallized programs, reveal they are applying bright coatings of aluminum, heavy enough to be virtually opaque, at speeds in excess of 2,500 ft./minute. This pilot plant handles plastic and paper web materials, including strip and wide rolls, uses vacuum pressures of the order of 10^{-3} mm. mercury, holds the aluminum vapor source at a temperature "over 1300 C." It is also being used to study coating of synthetic fabrics of several types for both decorative and reflective insulation uses.

George Bancroft, manager of Consolidated Electrodynamics' new-product development, says his firm is "definitely active in the field of continuous coating and the development of high-rate evaporation sources, particularly for the evaporation of aluminum." He explains: "Recently, we have been

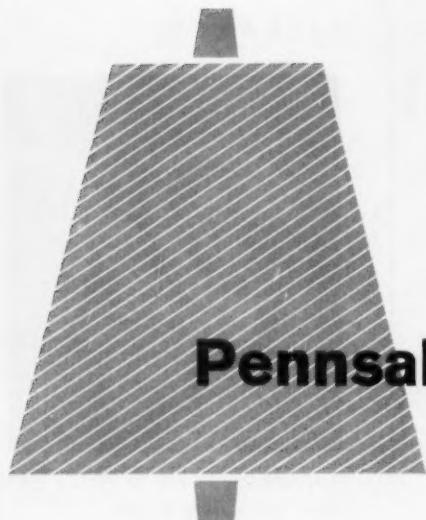
working on sources that would handle several pounds of aluminum per hour, since the lack of such a source had been a limiting factor in the past."

Most of Consolidated's equipment is batch-type. But there is much research on this type of process, too.

Steel Saver: Stokes' product specialist, Morton Gilbert, believes vacuum coating holds great potential as a new method of applying protective coatings to high-strength steels. His reason: "Unlike electrolytic methods, the vacuum technique produces absolutely no hydrogen embrittlement to cause delayed failures in stressed high-strength parts." Electrolytically deposited cadmium is an inexpensive, lightweight protectant for steel. But operational and even hangar failure of aircraft parts have been traced to its use. Vacuum-coated cadmium will eliminate this hazard, Gilbert believes.

Both Stokes and NRC have also developed equipment for plating aluminum on steel, also important in aircraft. Costs are considered competitive with electroplating. The ductile, nonporous coatings may also be anodized and colored to produce decorative effects in automobile and appliance parts.

Broad Application: NRC vacuum-coating projects include electrically conductive coatings, which transmit 75% of visible light, and are stable



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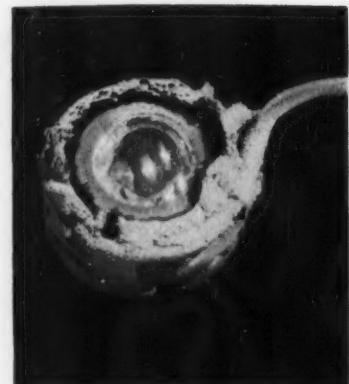
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New crucible is key to NRC's high-speed metallizing process.

at —50 to 200 F. According to John Cerych, project manager, the coatings are potentially valuable in defogging vehicle windows. Other uses: semiconductor depositions (for miniaturized circuits); coating metallic and nonmetallic powders (e.g., copper-coated silicon carbide has better bonding properties when cemented into abrasive wheels); and plating out alloys.

NRC has successfully vacuum-deposited two- and three-component alloys with good control of alloy composition. Typical examples include cadmium-bismuth-silver for electrical properties; gold-nickel for brazing; and aluminum-zinc for corrosion resistance.

These are only some of the fields vacuum coaters are tilling for new ideas. For example, gold may take on new importance as a plating material. In ultrathin, low-cost films, it can be coated on the inner plastic of auto windows, screening out infrared (heat) rays. It is also said to be useful as a heat reflector on rocket surfaces exposed to the heat of the exhaust on launching.

Another opportunity exists in wrinkled-finish metallized coating: metal is applied to wrinkled-finish lacquer. On large, flat surfaces, this finish hides surface defects and dust. Also, flexible polyethylene can now be metallized, thanks to recently-developed lacquers that promote good adhesion between plastic and metal.

In a figurative way, there's still more gold to be found in the spectrum of uses awaiting vacuum coating. Plastics, fiber, metals, paper and other chemical process industries will be seeking their share.

PRODUCTS

Missile Window: Eastman Kodak Co. (Rochester, N.Y.) has developed a new optical material called Irtran for "windows" in heat-seeking missile guidance systems. It reportedly transmits infrared beyond 1200 F, reduces guidance-foiling problems, costs less than competitive window materials such as sapphire or silicon.

Brimstone Finds: Liquid sulfur trioxide using a new stabilizer is now offered as a sulfation and sulfonation agent by Du Pont's industrial and biochemicals department. Sulfur tetrafluoride, a reactive gas featuring the ability to replace oxygen with fluorine in many chemical compounds, is newly available in development quantities from Du Pont's dyes and chemicals division.

Carbon Taggers: Petroleum researchers can now get 1-heptene-1-C¹⁴ from Research Specialties Co. (200 South Garrard Blvd., Richmond, Calif.) for studying hydrocarbon mechanisms.

Nuclear-Chicago Corp. (333 East Howard Ave., Des Plaines, Ill.) has set up a new program to custom synthesize chemical compounds labeled with radioactive carbon-14.

Pure Gold: American Smelting and Refining Co. (Plainfield, N.J.) is producing high-purity (99.999% plus) gold for research purposes. Ordinary gold contains about 200 ppm. of impurities; the new high-purity gold contains 10 ppm. or less. Price: \$50/troy oz.

Standard Samples: New standards available from The American Petroleum Institute (Carnegie Institute of Technology, Pittsburgh, Pa., Attn. Frederick Rossini) include:

Organic nitrogen compounds — pyrrole; pyrrolidine; pyridine; 1-methylpyrrole; 2-methylpyridine; 9-methylcarbazole. Price: \$65/5 ml. sample.

Organic sulfur compounds — methyl tert-butyl sulfide; isoamyl mercaptan; diisopropyl sulfide. Price: \$65/5 ml.

Hydrocarbons — 1-methyl-cis-2-ethylcyclohexane; 1-methyl-trans-2-ethylcyclohexane; 1,2-dimethyl-3-ethyl benzene. Price: \$65/5 ml.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

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POSITIONS VACANT

Opening for research and development chemist experienced in manufacture and use of wax compounds, wax emulsions, resins, polymer dispersions, cleaners and household chemicals in a manufacturing company laboratory located in the Middle West. Apply by letter, enclosing photograph and giving full details of education and experience. All replies will be confidential. P-1975, Chemical Week.

Stanford Research Institute offers challenging employment opportunities in chemical marketing research to Chemical Engineers or Chemists with 5 years of broad-line industrial experience in commercial chemical development, market research, or economic feasibility studies. Advanced technical or business degree preferred. Top level industry contacts, authorship of professional articles, and foreign travel possibilities complement an atmosphere conducive to development of personal competence. For information, send resume to Economics Employment Coordinator, Stanford Research Institute, Menlo Park, California.

Plastics Salesman: Spencer Chemical Company seeks a man with enthusiasm, drive, and a desire for future progress in a plastics sales assignment. Preferably, we would like a man with technical education and approximately five years' industrial sales experience. This position offers an excellent opportunity for future advancement in an expanding organization. Please send complete resume of your experience, education, and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Sales Trainee: Excellent opportunity for young college graduate with a technical background to join the expanding Plastics Division of Spencer Chemical Company. One to three years' industrial experience desirable. We expect the men selected to qualify for promotion and transfer to a territorial sales assignment within a reasonable period. In reply please send complete details of education, experience and salary desired to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Chemical Salesman: Diversified sales program offers interesting challenge and opportunity for outstanding accomplishment to the right man. A growing number of chemical products are being supplied to many industries, including the paint, rubber, metal finishing, paper, ceramics and agriculture business. Three years' selling experience and a technical background are preferable. Please send complete resume of your experience, education and salary requirements to Vice President of Sales, Berkshire Chemicals Inc., subsidiary of Vitro Corp. of America, 630 Third Avenue, New York 17, New York.

Technical literature specialist—chemical. Capable of assuming full responsibility for dept. Industrial experience in promotional & technical literature. Excellent salary, bonus and non-contributory profit sharing plant N.Y.C. Write fully. P-2342, Chemical Week.

Plant Manager—Rapidly growing heavy chemical manufacturer in New Jersey needs a qualified man to manage one of its Sulfuric Acid plants. Experienced in sludge and burning process is mandatory. Broader responsibilities will develop rapidly with our program of planned growth. Replies will be held in strict confidence. P-2361, Chemical Week.

Market Analyst: The rapidly expanding Plastics Division of Spencer Chemical Company needs a qualified market analyst, with minimum of two years of industrial market research experience. Chemistry or engineering (chemical or mechanical) degree preferred; marketing courses and/or experience also desirable. Highly diversified, interesting work with present and potential products, and their widely varied end-use markets. In reply send complete details of background and experience to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Experienced research and formulating chemist in the maintenance cleaner, cosmetics or skin cleanser field. Opportunity with expanding company. All replies confidential. Send complete resume of experience, education and salary requirements to: Personnel Manager, G. H. Packwood Manufacturing Company, 1545 Tower Grove Avenue, St. Louis 10, Missouri.

SELLING OPPORTUNITY AVAILABLE

Chemical jobber upstate New York, fine well-established line Industrial Chemicals, requires services experienced Industrial Chemical Salesman. Liberal salary, commissions, expenses. Car furnished. Opportunity advancement. Chance to buy into company over the years. If experienced, send resume to SW-2107 Chemical Week. Our employees know of this advertisement.

Salesman wanted—industrial chemicals. The two Carolinas and Virginia. SW-2343, Chemical Week.

POSITIONS WANTED

Sales Management position in chemical or oil lied by aggressive young man, married. Several years successful experience dealing with all types industry in Southwest, for leading chemical manufacturer. Prefer Southwest or Western U.S.A. PW-2309, Chemical Week.

Industrial Chemical Sales, Inside or Outside. 3½ years experience selling industrial chemicals in Metropolitan New Jersey. 10 years experience as Office Manager for filtration equipment manufacturer. Married with family. Prefer Metropolitan New Jersey-New York area. Mr. C. J. Haught, 931 Revere Drive, Hillsdale, New Jersey. Telephone Elizabeth 2-1933.

European technical representative. American chemical engineer in Europe three years seeks position doing technical scouting or chemical market research. Unusual American and European experience in this field. French and German. PW-2297, Chemical Week.

Employee Relations Manager. Proven record for maintaining industrial peace. Experienced, trained, progressive. Employed but seeking more challenging opportunity. PW-2338, Chemical Week.

10 yrs. experience in Industrial Sales, Liaison & Engineering. Accustomed to dealing with management & engineering. Seeking sales & or liaison. PW-2430, Chemical Week.

SELLING OPPORTUNITY WANTED

Chemical Solvents, Distributor, Metropolitan, New Jersey area with waterfront plant and extensive rail facilities for storage and drumming Red Label products is desirous of performing these services for someone on long term basis. RA-2378, Chemical Week.

MANAGEMENT SERVICES

"In Engineering, It's the People that Count." Engineers and Contractors for the Petroleum and Chemicals Industries. The C.W. Nofisinger Co., 307 East 63rd St., Kansas City 13, Mo.

CONTRACT WORK WANTED

Custom Grinding-Ultra Fine or Course-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete C.O.F. installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

One of Britain's largest and best known steel fabricators desires to contact American contractors to the Oil and Chemical Industries interested in having their specialized products manufactured under license in the United Kingdom. All facilities available for manufacture and machining fabrications up to 75 tons each. Please contact J. S. Moffat, Sales Director, Weldall & Assembly Ltd., 10 Norfolk Street, London, W.C.2.

BUSINESS OPPORTUNITY

Plastics & Chemical Corp. For Sale—Lock, Stock, and Barrel. Management retention optional. In second year of operation. Good potential. Total capital required, less than \$100,000. Sale must be consummated by Sept. 10th. Reply to BO-2385, Chemical Week.

FOR SALE

\$3,000,000 Liquidation-Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

1—Link-Belt #604-18 Roto-Louvre Dryer, 6'4" dia. x 18' long. Complete with fans, feeder, dust collector, etc. Perry Equipment Corp., 1415 North Sixth St.

WANTED

Wanted Used Lab Equipment, Including: Analytical Balances, scales, furnaces, ovens and miscellaneous equipment. Write Box 7151, Pittsburgh 13, Pa.

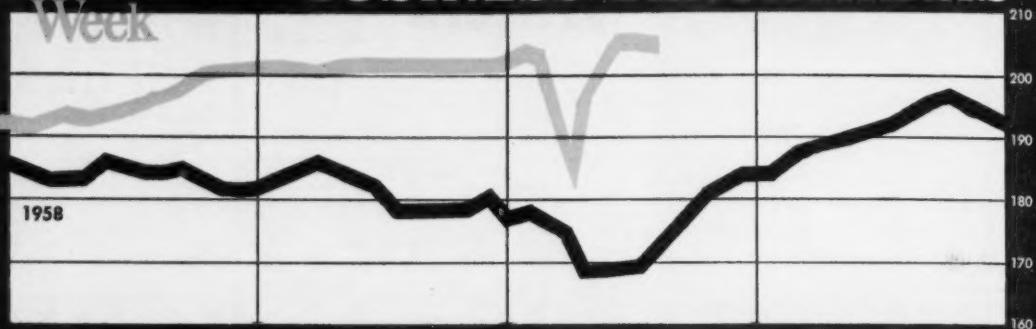
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Chemical

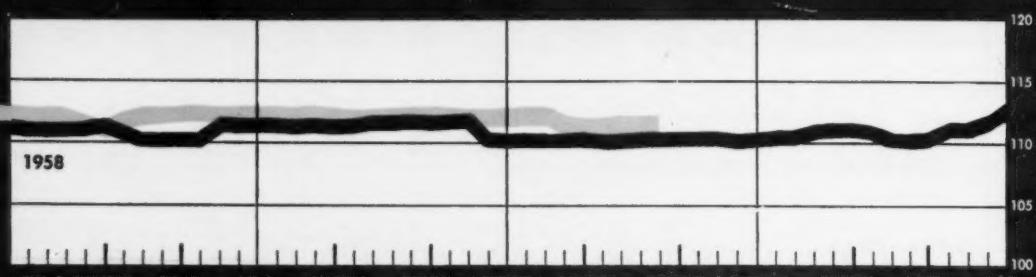
Week

BUSINESS BENCHMARKS

'59 OUTPUT INDEX



'59 PRICE INDEX



AUGUST 22, 1959

WEEKLY BUSINESS INDICATORS

Chemical Week output index (1947-1949=100)
Chemical Week wholesale price index (1947=100)
Stock price index (12 firms, Standard & Poor's)
Steel ingot output (thousand tons)
Electric power (million kilowatt-hours)
Crude oil and condensate (daily av., thousand bbls.)

LATEST WEEK	PRECEDING WEEK	YEAR AGO
204.7	205.0	175.0
110.8	110.8	110.6
60.05	61.60	44.43
332	318	1,632
13,675	13,775	12,707
6,789	6,808	6,836

MONTHLY INDICATORS—Trade (million dollars)

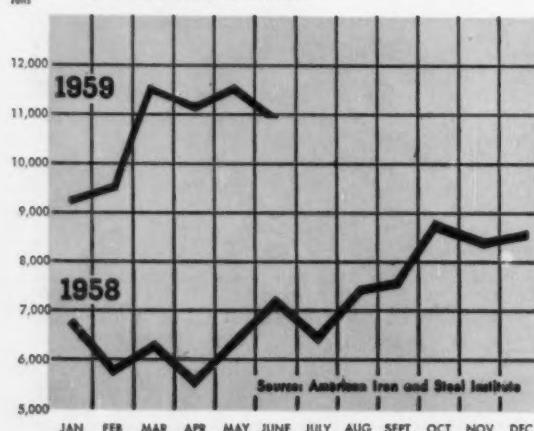
All manufacturing
Chemicals and allied products
Petroleum and coal products
Paper and allied products
Textile products

Manufacturers' Sales

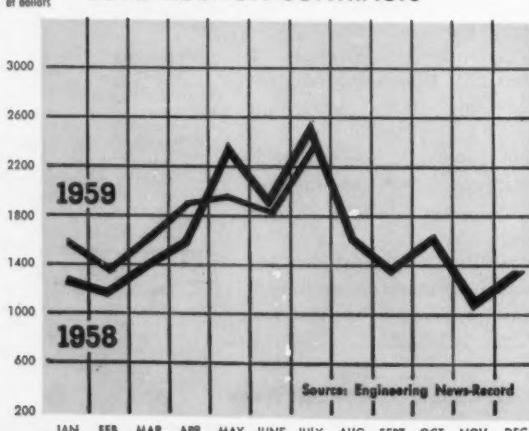
LATEST MONTH	PRECEDING MONTH	YEAR AGO	LATEST MONTH	PRECEDING MONTH	YEAR AGO
\$31,256	\$30,742	\$25,747	\$52,084	\$51,599	\$50,246
2,144	2,089	1,899	3,770	3,730	3,747
3,072	2,994	2,682	3,389	3,380	3,348
1,027	1,026	903	1,488	1,482	1,435
1,314	1,310	1,025	2,505	2,487	2,572

CHEMICAL CUSTOMERS CLOSE-UP

STEEL PRODUCTION



CONSTRUCTION CONTRACTS



Source: American Iron and Steel Institute

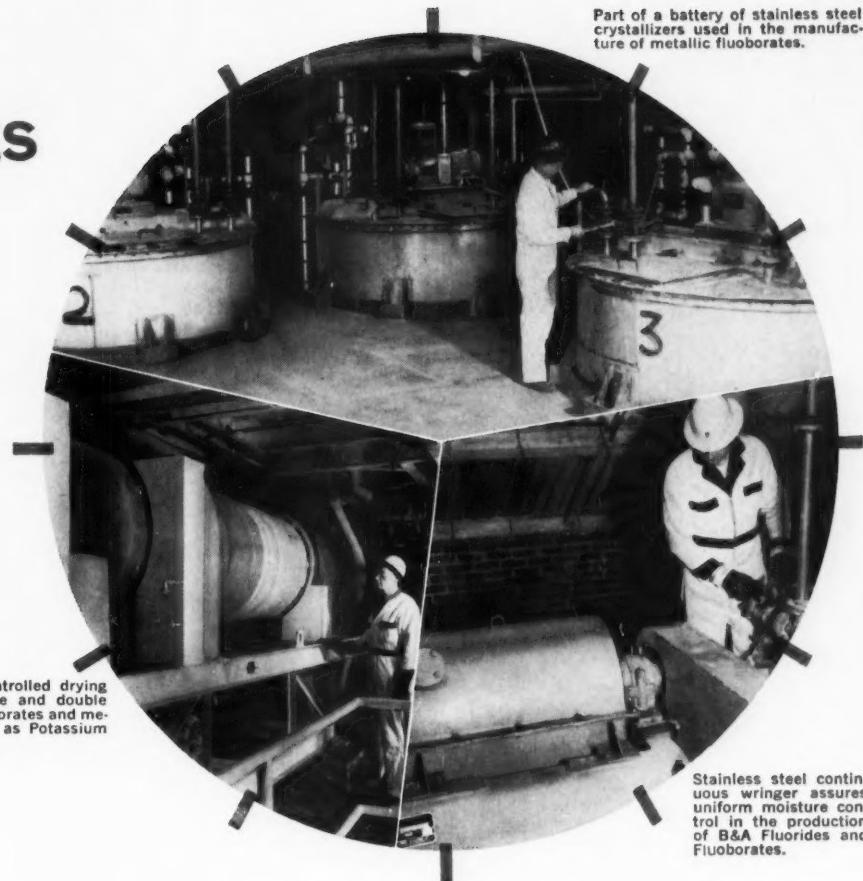
Source: Engineering News-Record

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Rotary dryer for controlled drying of high purity single and double fluorides, alkali fluoborates and metallic fluorides such as Potassium Titanium Fluoride.

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Potassium Fluoborates
Potassium Titanium Fluoride
Sodium Fluoborate
Ammonium Fluoborate
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(Electronic, C.P. and Reagent Grades)

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Bay Minette, Ala., these Durco
Type K "Y" valves have been handling
SULFURIC ACID AND BLEACH SOLUTION**

for almost three years with virtually no maintenance.

Durco Type K "Y" valves provide positive closure without galling; maximum flow with minimum pressure drop; positive sealing at the stem with Teflon V-ring packing; renewable seat and disc ring of Teflon, Durimet 20, Duriron, or other alloys; and all stainless trim. The gland design utilizes rolling point contact of the gland follower, insuring proper pressure distribution and preventing stem scoring. Unique disc assembly permits renewal of disc ring, prevents failure in service, and extends valve life.

Durco Type K "Y" valves are available in Durimet 20, Durco 18-8-S-Mo, Monel, Nickel, Chlorimet 2, and Chlorimet 3. Complete details of construction are contained in Bulletin V/7a.



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